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THE RUBBER ASSOCIATION'S EDUCATIONAL PLAN

THE RUBBER ASSOCIATION today represents not only the majority of American rubber manufacturers but their wealth, experience, enterprise and brains. From the very nature of the industry that supports or supplements all other great industries rubber executives have the broadest of all outlooks. They have perforce a knowledge of general manufacture and markets such as no other line demands. This concentration of experience and knowledge through association is in the line not only of efficiency and economy but should be a direct powerful aid to progress. That such a concrete, vital force should be voiceless is unthinkable. Mimeographed letters, circulars and printed leaflets are not sufficient. Educational articles, informing paragraphs, pictures, statistical facts, historical sketches published in newspapers, in magazines or issued in books or bulletins would be of great value. The field is a broad one and so far its surface only has been scratched. What other associations have done The Rubber Association can do and do better.

FORTY-THREE MILLION TIRES?

THE PERSISTENT PESSIMIST, intoning jeremiads on the outlook of trade generally, will find but little material for lamentations in the recent national review of the automobile industry. According to the official figures compiled by the American Automobile Association, the motor car registrations for 1920 reached the surprising total of 9,180,316. Nor does this total include a twelfth month in either California or New York. With those figures added, the total might well reach the figure of 9,300,000. Evidently automobile buyers did not worry much about adverse business conditions last year when they thus overtopped 1919's total of 7,065,446. Of the whole number registered, approximately 8,234,490 were classed as passenger cars, 945,826 as commercial; and 271,230 in addition as motorcycles.

To the rubber trade such a showing has considerable interest. It means a large item of business. If 1921 should witness a similar 23 per cent increase, this year's output of cars would be 2,111,472, or a possible total registry of 11,411,472 cars for the year. Assuming that four tires and a spare would be needed for initial equipment for each car, a total of 10,557,360 tires would have to be produced for the new automobiles. An average of three tires apiece, it is figured, would be required for the 9,180,316 cars already in use, thus making a total estimated demand for tires in 1921 in the United States of approximately 38,000,000, not to mention even more tubes.

Despite the always conflicting reports, trade conditions abroad are slowly but surely returning to normal; and it is reasonable to expect that enterprising American tire manufacturers will follow up closely every advantage gained by them during and since the war, and press the sales of perhaps 5,000,000 more tires beyond the seas. Forecasts as to tire sales and manufacture can have as large a percentage of error as those in any other industrial line, but it is fair to claim that the foregoing figures are quite conservative and that they afford a fair index of the trend of trade in automobile tires.

BRITISH RUBBER MEN VERY MUCH AWAKE

THAT very able and interesting journal, *The Rubber Age*, of London, asks the question: "Are British rubber manufacturers asleep?" The article that follows it would indicate, by suggestion at least, that the Editor of our esteemed contemporary thinks that they are. Personally, we do not think so.

In speaking of British rubber manufacturers, one naturally thinks of the Dunlop company, with their one hundred millions capital and their tremendous output. Certainly if they are asleep, their great factories in Eng-

land, the United States, Canada, Australia, Italy, Denmark, Norway, Sweden, Spain, Portugal, Holland, Belgium, South America, India and Japan, would argue that dreams may sometimes come true. For the comfort of the manufacturers in the United States, one could also hope that the Dunlops would not wake up, for if they can do so much sleeping, the whole tire business of the world would be in their hands waking. No, British rubber manufacturers are not asleep. They are not even nodding.

RUBBER AND FIREPROOF LUMBER

THE USE of solutions of soluble glass, alum, soda, borax, and the like for impregnating wood to render it less inflammable dates back many years. So also are heat-resisting rubber compounds in which asbestos is the heat-resisting material. Of these are, "Vulcabeston," the "It" products and the more modern brake lining. There was also "Intonaco," made of gluten, albumen, oil, sulphate of lime and india rubber. This was used as a covering for wooden shelves as a preservative from fire, and for wainscoting, tiles, etc. All of these suggested the practicability of fireproof lumber.

It is not of course claimed that such products are actually indestructible. Great heat will fuse anything. That these products are not inflammable, that they will char but not burn, argues a vast superiority over ordinary wood with its inflammable resin varnish covering.

HOW ABOUT IDLE AMERICAN SPINDLES?

AMERICA is making a serious mistake, so say economists, in not making extraordinary efforts to put Europe "on its feet" so that it may quickly resume large-scale buying of our surplus products. Unless our export trade is soon expanded it will be impossible for the United States to maintain its present high standard of living. In order to keep Europeans employed so that they may produce a surplus to be exchanged for American articles, it is claimed that we should supply them with our raw materials on the easiest terms. The present method of "trusteeing" cotton to one of the new southern European republics, for instance, is mean, cumbersome, and expensive, one expert says. Instead, he would keep the cotton mills abroad going by supplying them with our cotton and taking as the sole security, mortgages on their mills, against which long-term bonds or debentures would be issued and sold to Americans.

This is in line with the appeal made lately to the long-staple cotton growers of the Southwest that they ignore the home market and ship their product to southern Europe, where they would get a much better price in goods than they would get in cash in the United States. But the cotton growers hesitate to enter such a scheme of barter, doubtless realizing that in the long run they will serve their own interests best, not by helping other nations to forge ahead, but by favoring their own country that has with great irrigation systems and other aids made their fruitful plantations possible. To them the motto, "Charity begins at home," has both a personal and a patriotic significance.

Helpful as we may like to be—and surely American liberality is well evidenced in the billions loaned to Europe, we can hardly be expected to extend our debt hazards still further in order that the spindles of Europe may hum while our own may be idle. Self-protection does not necessarily imply selfishness. Indeed, many of the nations craving our aid are even now planning tariff and other barriers to shut out American products and thus lessen employment for American labor.

The simple fact is, Europe will find itself. And if America takes too seriously some of the suggestions of well-meaning, but deluded altruists it may before long have some keen regrets. The world has emerged badly bent, it is true, but not broken from the most violent upheaval and exhaustive strain to which it was ever subjected. The probabilities are that, just as it contrived to pass successfully through trying reconstruction periods in the past, it will do so again in the near future. But in the great readjustment it will not be the dilettante doctrinaires nor the professional politicians who will do the real work, but the men who always rehabilitate national and international trade, the practical, broad-minded, enterprising captains of industry and the fair-spirited, far sighted financiers, of whom America has fortunately some of the finest types.

FRENCH PROGRESS

THAT FRANCE is coming back fast in the matter of production, as well as in expanding its foreign trade, is graphically illustrated in recent commercial bulletins. These show, among other things, that the nation improved its adverse trade balance by 9,000,000,000 francs, or almost 50 per cent, from January 1 to October 31, 1920, as compared with the first ten months of 1919. In 1918 French export trade totalled 4,750,000,000 francs; in 1919 it almost doubled; and in the first ten months of 1920 it amounted to four times the value of the 1918 export trade. It is true that France has been a large importer meanwhile, merchandise brought from overseas in 1919 totalling some 29,750,000,000 francs, and reaching 27,250,000,000 during the first ten months of 1920; but the imports, which have been largely of raw material for conversion into goods for export, have been declining since last April.

No complete figures are available regarding the recovery of the French rubber trade, but it has kept pace with the forward march of other industries. Thus the French exports of automobiles and accessories for the first seven months of 1918 were valued at 74,000,000 francs; for the same period in 1919, 147,000,000, and for the same period of 1920, 848,000,000.

Repairing Rubber Footwear—II[1]

A New and Fast Growing Industry

Borrowing from the Cobbler—Footwear Repair Prices—Stock for Patching—Drying Before Patching—Applying Rubber Heels—Details of the New Miller Vulcanizer—Dilks Rubber Boot Repairer—Arthur Sole and Heel Mold Former—Arthur Plural Part Mold Vulcanizer—The Ferguson Vulcanizer—The Best Shoe Vulcanizing Device

BORROWING FROM THE COBBLER

RUBBER BOOT AND SHOE REPAIR is today in its infancy. It stands where tire repair did fifteen years ago and its progress will probably be along similar lines. That is, the present tools, machines and appliances will be superseded or added to until the best and most effective remain. So too, instead of the repair section for footwear occupying a dark congested corner, a light, orderly department will be evolved.

As the work has to do with shapes almost identical with leather shoes there are doubtless many appliances used by the cobbler that will be taken over. Take for example, the "jack" which is used as a sort of anvil by the leather shoe repairer and for working on rubber boots and shoes, and certainly has its value. There are many types, they are simple and great time savers.

And not only the cobbler suggests added equipment but the leather shoe manufacturers as well. They are large users of rubber cement for channel and inseam work. For this there is a very effective channel cementing machine. Possibly it would need some changing for rubber shoe repair work, and quite a volume of business to keep it busy, but it would be clean, compact and safe.

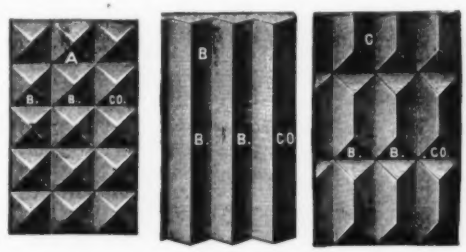
THE "JACK"

FOOTWEAR REPAIR PRICES

While much complaint has been made in the large cities of the United States of profiteering in the repairing of leather shoes (the charge for resoling and reheeling of which has ranged from $2.50 to $4 a pair according to quality of job and service) little or no fault seems to have been found with the prices charged by repairmen who specialize in mending rubber footwear. Despite the general advancement in overhead and other expenses, the cost of repairing rubber boots and shoes has increased relatively little above the pre-war prices.

The very best job in half-soling rubber boots is now from $1.50 to $1.75, and full soles with heels are put on arctics and rubber boots for $2.25 to $2.75, the charge depending upon whether the boots are children's or adults'. Tennis and other athletic shoes with rubber soles worn down can be "retreaded" completely and made to look like new (resoled and reheeled), for $1.50 to $1.75 a pair, according to the size of the shoe. Light-weight rubbers are seldom brought in for repair. Repairmen say that the prices quoted yield them a fair margin of profit and that it is always higher in shops having up-to-date repair equipment.

While the business of repairing leather shoes was given a great impetus during and after the war, owing to the high price of leather, etc., in the past year the rubber footwear repairing industry has also been steadily forging ahead. While its growth may not have been as swift as that of leather shoe repairing, men who mend rubber footwear are confident that the development of this line has been more substantial. They are inclined to think that as leather shoe prices recede, as is now generally forecast, there will be a slackened demand for the services of the men who mend such shoes, whereas no such slump is expected in the rubber shoe repair line. This in part is because the prices of rubber footwear have not been unduly inflated and there is



TENNIS SOLING

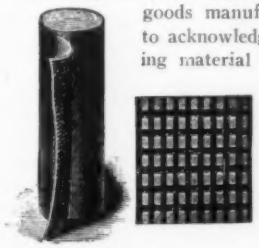
a steady improving demand for footwear made wholly or partly of rubber, most of which will sooner or later be overhauled by the rubber repair shop. Nor do the latter have to compete with the very numerous home-repairers, who, reluctant about paying the high prices charged by most leather shoe cobblers, mend their own shoes.

Speaking again of prices, it is interesting to consider the cost of resoling leather shoes with rubber taps and cut soles and heels, and the prices obtained for such work, as well as the conditions that insure a good job. An average price on rubber fiber half-soles of a nationally advertised brand is $1.25 or $2.50 for full soles with rubber heels. The latter are furnished and applied for 35, 50, 65 and in a few cases for 75 cents.

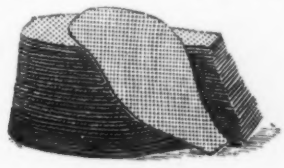
Repairmen emphasize the fact that there is no economy in putting a rubber sole on a cheap leather shoe. They contend that such a sole, no matter how high its quality, is doomed from the start if it be applied to a papery composition insole. The latter soon begins to disintegrate and chafe the rubber sole so that it will split or burst across its center within three or four weeks. Properly cemented, however, to an insole of good "siding" leather such as is found in the better class shoes, the rubber sole often gives excellent wear for a year. The manufacturers do not guarantee their soles for this reason.

STOCK FOR PATCHING

It is only fair to the big rubber shoe companies, the mechanical goods manufacturers, and the shoe-findings men to acknowledge that for years they offered patching material to whoever wished to buy it. For example, the makers of the Snag-Proof rubbers long had a line that they called repair sundries. These consisted of corrugated soles for boots and shoes, cut to size, thus saving waste. There was also patching for upper repairs, plain soles and heels. With



BOOT AND SHOE SOLING



SOLING CUT TO SIZE

[1]Copyrighted by Henry C. Pearson. Continued from THE INDIA RUBBER WORLD, March 1, 1921, pages 397-403.

this went a strong cement in bottles, or screw top pint or quart cans.

The oldest company in the United States, the Boston Belting Co., for years advertised rubber soling for boots and shoes, either smooth or rough finish. It was sold in rolls 60 feet long and 34 inches wide. The rough or corrugated type was from 1/16 to 3/16 of an inch thick. They also furnished tennis soling in three patterns, diamond point, corrugated and oblong. This was finished in strips 32½ inches long and 12½ inches wide. For attaching they furnished a strong cement in pints, quarts and gallons. As to general patching stock they made a dull finished stock in three weights, light, medium and heavy. This was furnished in pieces 12 inches square, 24 pieces to a box.

KING'S SOLES

Canadian manufacturers also placed before their trade "ready to apply" soles. J. D. King & Co. furnished soles that were exact duplicates of those on the Maltese Cross rubbers and gave for sticking purposes the Stub Proof cement.

One of the most complete sole and heel repair products brought out by the Canadian Rubber Co. was the Roedding repair sole and heel. This had an extension edge all around the sole or heel and was particularly designed for lumbermen's heavy overs and leg boots. They were made in regular sizes, No. 6 to No. 12, and were attached by a special cement sold in cans, big and little.

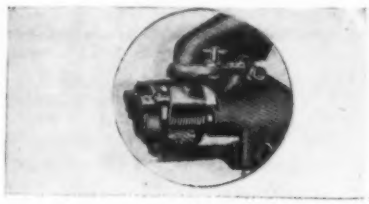
KING METHOD—BEFORE AND AFTER REPAIRING

In England, gutta percha soles were sold for repairs for years. They were excellent, could be attached firmly by heating, and outwore leather. The scarcity of gutta percha and its costliness, however, drove them from the market.

DRYING BEFORE PATCHING

The question of drying comes up again and again so that its importance cannot be overemphasized. To be sure, goods may stick if a little moisture is sealed up inside of the repair. Nor does it always show in surface blisters. It will, however, prove a damage. Damp fabric securely sealed by patching starts to rot at once and as much of the strength of footwear lies in the fabric, weakness and often disintegration results. It really does not matter how the boot or shoe is dried provided it is not baked dry and thus damaged. Hanging high over the presses in a warm current of air only long enough to dry is good. Or a wire rack high up where it is warm is also good practice. Sunning is very bad. Quick removal of moisture is best for the rubber. Thus, one repairer for the sake of speed ran a pipe from his air compresser, had a gas jet turned low under the pipe and sent a gentle current of hot air into the wet boot. According to his story it worked quickly and perfectly. Another, who at one time worked in a stocking factory, secured some aluminum stocking forms, rigged them up with steam and dried boots, shoes and arctics upon them. Hot sand will do as a dryer and so will warm shot but they are troublesome to handle as the grit gets into the work, and they are makeshifts at best.

ROEDDING REPAIR SOLE AND HEEL



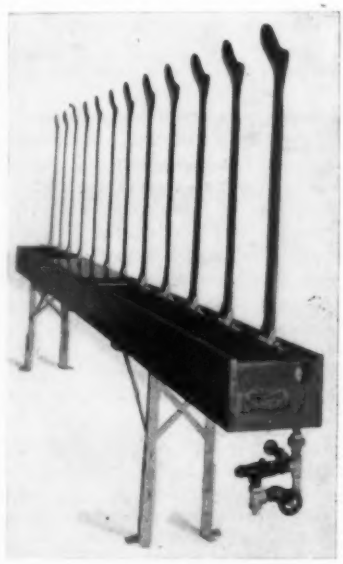
SOLE CEMENTING BRUSH

APPLYING RUBBER HEELS

The rubber shoe repairer will perforce be obliged to put many rubber heels upon rubber footwear. In some cases he may simply add a thick patch but in some he may add solid heels. Indeed, it is possible that he may buy ready-made heels, burr the upper side, cement and attach. If he can fasten by a few nails all the better. In this work he may be interested to know that for years rubber boot heels were vulcanized in molds, the upper surface roughened by burring, coated with a strong litharge and rubber cement, stuck in place and vulcanized a second time with the whole boot. Today, the heels are built with the top layer of stock being so compounded that it only semi-cures while the rest of the heel cures thoroughly. The semi-cured upper part cemented and applied to the boot sticks forever and a day. Possibly in the near future heels prepared in just this way will be a part of the stock kept by the rubber boot repairer. Speaking of heels, is it not possible that the rubber shoe repairman may take on also the work of attaching rubber heels to leather shoes as well?

GROWTH OF THE RUBBER HEEL INDUSTRY

Twenty years ago the rubber heel was still a novelty at which the public looked askance. It is true that there was a limited demand for nurses' shoes with solid rubber heels attached and a few manufacturers were timidly offering walking boots with rubber heels but usually the shoe buyer who was won over to rubber heels had to get them as extras and while willing to have them put on after he had worn down his leather heels, was very reluctant about buying them as original equipment of shoes. A mistaken notion of thrift and fewer concrete sidewalks, hardwood floors and tiled hallways doubtless accounted for such an attitude. Then, too, there was the prejudice against rubber heels as being too slippery on wet surfaces and the objection that walking with such heels gave one a "sneaky" gait. But the rubber heel in itself had so much to commend it to pedestrians, that in time it attained world-wide popularity.



DRYING FORMS

Many enterprising manufacturers realizing that it was "due," strove not only to anticipate the demand, but also to create it, but most of the early products had so many shortcomings that the public proved very unresponsive. The common failing was

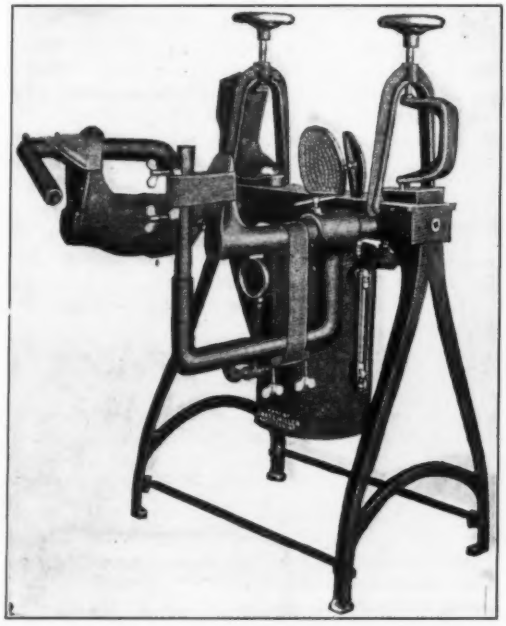
sameness in style, no dominating feature to commend them to buyers. The very uniformity of pattern invited the unscrupulous to flood the market with crude imitations of the good products that discredited the latter and ultimately harmed the entire trade. The remedy for such a condition was to make heels of such distinctive merit and originality that substitution could not be easily attempted by the makers of spurious goods. This proved the turning point in the industry. Since that it has grown by leaps and bounds.

While there is, and is always likely to be, a great output of the plain type heels of inferior compounds to meet the demands of the buyers of the commonest types of leather footwear, the public is steadily showing a keener appreciation of the rubber heel that is "tailored to the shoe," that has a real non-slip feature—a safety cushion or suction grip, or a heel that imparts a marked springiness to the step. Particularly have buyers learned that durability and resilience can be obtained only with high-grade compounds and manufacturers have found that the public is willing to pay for an article of real merit.

As indicating the rapid growth of the rubber heel industry, it is stated that some manufacturers are turning out nearly 100,000 pairs a day, several others about 50,000 and dozens making 5,000 to 10,000 a day, making the total daily production about 500,000 pairs. The daily output of leather shoes is given at 2,059,000 pairs. Thus it would appear that practically 25 per cent of the leather shoes made now either have rubber heels as original equipment or will be fitted with them directly after purchase or when the leather heels are worn down.

DETAILS OF THE MILLER VULCANIZER

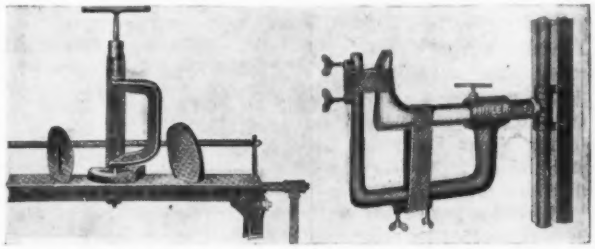
In our last issue was shown the original Miller machine as a whole. Here is given the latest model and the two important elements, the sole and heel repair table, and the part for accomplishing other repairs. For sole repairs a type of hot plate or hollow, steam-heated table is employed. Sole plates with extra high sidewalls, or upcurled edges, and with the inner surfaces



THE NEW MILLER FOOTWEAR VULCANIZER

deeply indented to give a serrated or rough configuration in molding are provided. These are placed upon the hot-plate and upon them are set the boots or shoes to be repaired. Into the foot or shoe is thrust an inside sole last upon which is fitted a *C*-shaped clamp with set screw and with it a powerful pressure is obtained. The clamp frame is arranged to be bolted to the hot-plate of the vulcanizer.

The essential features of the Miller inside boot vulcanizer unit

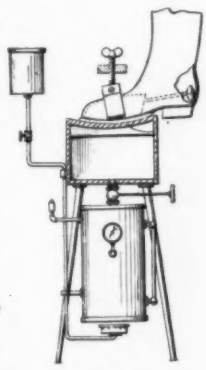


MILLER SOLE REPAIR UNIT MILLER PATCHING UNIT

are the hollow boot form and the device for applying tension. In making a repair to any part of a boot or shoe other than the sole, the article is placed over the foot-like form, and the revolvable, adjustable outside arm is brought to a point opposite the part of the boot or shoe to be repaired. A cloth or other band is then stretched over the repair spot on the footwear and the desired pull, or pressure, is given by tightening either the side or the underneath tension screws on the swinging arm.

DILKS RUBBER BOOT REPAIRER

A self-contained, steam-heated repair vulcanizer for rubber boots and shoes, invented by Charles F. Dilks, provides a very good means for economically and efficiently mending rubber footwear. It consists of a hollow metal mold concaved on top, supported on a metal stand, and heated by steam from a boiler underneath, a liquid fuel being supplied by gravity from a tank attached to the apparatus. In sole repair vulcanizing a two-section, wedge-shaped pressure last is inserted in the toe of the shoe or boot and spread by means of a screw having a knob at one end; this last fits in the shoe tightly above the heel. The outer side of the forward part of the shoe is gripped with a two-section clamp, adjustably joined with screws or bolts; and, by means of a thumb-screw held in place by a cross-bar, supported by two upright bolts, the clamped shoe is forced against the hot-plate beneath.



THE DILKS BOOT AND SHOE REPAIRER

When the heel of a shoe is to be repaired, the sections of the pressure last may be extended so that they will fill the heel part of the shoe. As the mold has twin concavities, with pressure screws, etc., two shoes or boots may be vulcanized at the same time.

ARTHUR SOLE AND HEEL MOLD FORMER

An early device for making metal former blanks for soles and heels and adaptable to various sizes and styles of rubber footwear is the Arthur. The apparatus consists of a *C*-shaped clamp fastened to a work bench, upon the horizontal anvil plate of which clamp is placed, with upturned sole, the article of footwear to be repaired. A piece of rubber to be vulcanized to the sole or heel, and conforming in outline to the sole or heel, is then placed on the upturned shoe. Over this is placed a piece of sheet lead somewhat larger than the piece of repair rubber, which may be serrated or indented to give either heel or sole on molding a roughened surface.

By means of the handle at the top of the clamp the set screw compresses the three articles tightly together, and the edge of the lead sheet is then beaten with a hammer until it hangs or over-

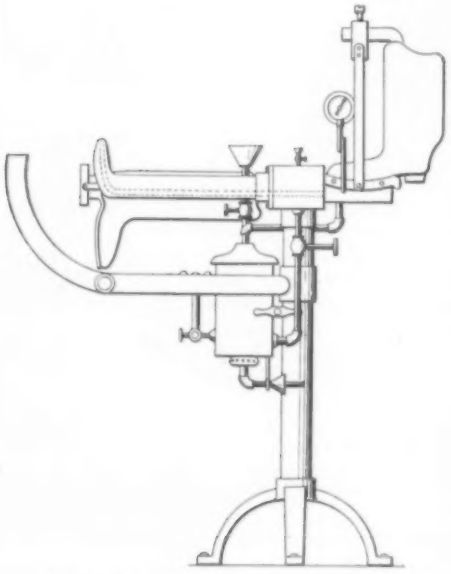
laps about evenly over the repair rubber and the sole beneath it. The articles are then released from the vise and, clamped in any suitable device, are placed in a vulcanizing apparatus, the effect obtained with the lead-former device being a repair rubber sole with a neatly turned and rolled edge much like that of new goods. The method for making former blanks for heels varies but little from that used for soles.

Arthur Mold-Making Press

This to a degree has been superseded by providing the lead molds complete to shoe repair men. To this end a full set of aluminum molds in which the lead molds are cast, can be obtained. These, of course, have a better finish and save a lot of bother for the user.

ARTHUR PLURAL-PART MOLD VULCANIZER

One of the newest and most complete rubber boot and shoe repair vulcanizers, adapted for practically all classes of work and which can withstand hard service, is the Arthur self-contained, steam-heated, plural-part mold apparatus. The device consists of a hollow, heavy standard in which liquid fuel may be stored to be supplied by compressed air to the burner beneath the boiler furnishing the steam to heat the hollow vulcanizing members. A large funnel over the boiler is used for replenishing it with water, and a small funnel over the standard is used for conveying liquid fuel to its reservoir.



Arthur Plural Part Mold Vulcanizer

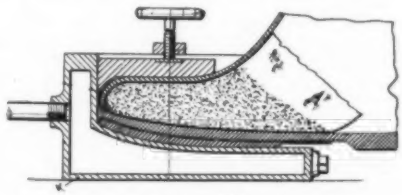
A dome, or box-like compartment, at the top of the standard and piped to the steam boiler, carries one or more hollow, revolvable, and adjustable boot forms or horns on one side and a soling plate or table on the other side. Other openings can be provided on the dome for other repair work. A unique mode of applying pressure while vulcanizing, is provided by a pair of parallel, transversely-joined arms projecting from the standard; and which in turn carry "goose-necked" curved, revolvable, adjustable devices which fit over the shoe forms and against which suitable pressure can be applied by tightening, with a pawl and ratchet, tension hands fastened on the inner side of the hook-shaped holders.

Sole repair is effected on a hollow curing table with a concave surface fastened to the dome above the standard but having its steam supplied directly from the boiler. A metal leg, last-shaped to project into the toe of a boot, is placed in the latter, the upper end of last passing through a member which contains a set-screw acting on tension bands fastened at their lower ends in the molded foot-plate on which the boot rests during a sole cure, and with which ample pressure is obtained.

A novelty, too, is a set of superimposed, springy plates of graduated size which can be fastened to the base of the last and which plates under tension give greater and more uniform internal pressure resistance on the sole of the boot. For smaller footwear, fewer plates are used. The apparatus can also be braced against a wall with a lateral arm extending from the dome.

THE FERGUSON VULCANIZER

One of the simplest of shoe repair vulcanizers is the Ferguson. It is simply a vulcanizing mold and is adapted particularly for resoling, as the steam chamber runs under the sole portion. The foot of the boot or shoe is filled by a sack holding sand while a top plate, cold, acts as a clamp and by means of a screw exerts sufficient pressure to secure proper molding and adherence. Not to criticise the appliance nor to prove the writer's inventive ability, but for the sake of light, we ask, Why not an air bag for the inside instead of a sand bag?



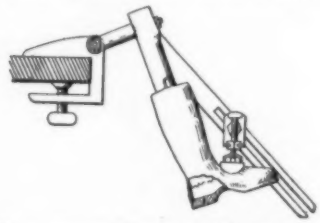
The Ferguson Vulcanizer

BAST SHOE VULCANIZING DEVICE

A simple and low-cost rubber boot and shoe vulcanizing device which dispenses with steam is the Bast vulcanizer. It has some ingenious features that will be appreciated by repair men with small shops. With it any part of a sole, heel, or upper can be easily and quickly given a repair cure without other heat than is afforded by gasoline. The apparatus is readily adjusted at any angle so that pressure can be applied at and where needed on the footwear to be mended. The device consists essentially of a jack or standard carrying a boot or shoe last, the lower end of the standard being pivotally adjustable to an arm which, in turn, is pivotally adjustable to a clamp fastened to a work bench. The last at the top of the standard can be revolved and, by means of a countersunk screw in the heel, can be set at any point.

Another feature is a flat arm pivotally adjustable to the lower end of the standard and carrying in a slot at the farther end a revolvable, slidable, adjustable metal former-block which, with a thumb-screw, can be forced against footwear in vulcanizing. The heat needed for curing is obtained by burning gasoline in a recess in the top of the former block, which in operation must be kept right side up. Teeth in various bearings insure positive clamping with the adjusting bolts.

Vulcanizing Boot Sole Repair



Vulcanizing Repair on Upper Part of Boot

A Glossary of Words and Terms Used in the Rubber Industry—IV[1]

By Henry C. Pearson

EAST INDIAN RUBBER—WILD

OLD TIME standard grades and also new, as they relate to wild rubber from the Far East, are fast disappearing. This is in part due to the plentiful supply of low cost plantation rubber and partly because jungle produced rubber is washed and sheeted at plantation factories, thus taking on the form of plantation products. It is chiefly as a matter of record, therefore, that the following are listed.

ASIATIC. Crude wild and plantation rubber from Malaya, India, the Dutch East Indies, Borneo and the Philippines.

ASSAM. The best known Asiatic wild rubber, the product of the *Ficus elastica*. The term applies generally to all Indian Ficus rubbers but specifically to the product of that tree from Burma, Annam, Straits Settlements, Federated Malay States and Sumatra. It is known also as Rangoon, Penang, Rambong, Sumatra and Java rubber. The latex is coagulated either by boiling, forming slab, or by air drying from which mat rubber and balls are made. It is marketed in oblong slabs or balls (onions). The rubber comes in four grades, No. 1 to No. 4, the best grade showing a glossy pinkish surface in cross sections. Lower grades are soft and dirty. Shrinkage 15 per cent to 40 per cent.

BORNEO. Rubber produced in Borneo, the Straits Settlements, the Celebes, Sumatra, Moluccas and the Philippine Islands. The principal ports of shipment are Macassar and Singapore. It ranks below other Asiatic sorts, is much lower in price and with a high rate of shrinkage. It comes in sheets and balls, more or less bulky, like pieces of liver and is soft and porous. The pores are filled with salt water or whey for the reason that salt is used to coagulate the rubber, and a saline incrustation is left in the cells when the water evaporates. Borneo rubber comes in three grades, the first of which is good while the lowest grade when cut is almost as soft as putty and is worth but little.

BRESK. See Pontianak.

BANDJERMASSIN. See Pontianak.

BENI KALEN. A grade of Java. See Assam.

COCHIN-CHINA. Rubber from the native vines and trees as the Parameira. Come in lumps, dark brown in color.

DYERA. See Pontianak.

DEAD BORNEO. See Borneo.

EAST INDIAN. See Assam and Plantation Rubber

FRENCH INDO-CHINA. Rubber from the Parameira, Bleecrodia and other sources.

FLUVIA. See Pontianak.

GAMBIA. See Pontianak.

GUTTA JELUTONG. See Pontianak.

INDIA GUM RESIN. A resin extracted from jelutong or Pontianak.

INDRAGIRI. A native rubber machined in Singapore. The product appears on the market as dry and wet sheet. On crêping a fairly strong blanket crêpe is produced.

JAVA. See Assam.

JELUTONG. See Pontianak.

LAMPONG. A grade of Java. See Assam.

MACHINED RUBBER. Wild rubber of native gathering, that is put through the process of washing, sheeting or crêping.

MAT RUBBER. Ficus rubber, air coagulated on bamboo mats. See Assam.

MANUNGAN PULAN. Singapore native name for Borneo rubber. See Borneo.

MALAYSIAN RUBBER. Deresinated jelutong from Goebilt, Sarawak, Borneo. Graded as light brown crêpe, dark brown crêpe and block.

NEW CALEDONIA. A product of a variety of trees and vines shipped from Port Villa in cakes weighing from 13 to 23 pounds. It is brown inclining to black in appearance and of a fair quality. Shrinkage 18 to 20 per cent.

PONTIANAK. A low grade rubber also known as jelutong, gutta jelutong, gambria, bresk and fluvia produced chiefly in Borneo from the latex of the *Dyera costulata*. Contains kerosene as a preservative and earthy matter as an adulterant. Yellowish brown surface, cuts white with a moist sour smell. Hard on the outside but softens like putty with slight warmth. Shrinkage 60 to 80 per cent. Although often classed with low grade guttas it is not a gutta but a very resinous rubber, the rubber content being about 10 per cent. The several grades are named from the districts in which the gum is produced as Palembang, Pontianak, Sarawak, Bandjermassin.

PONTIANAK RESIN. See India Gum Resin.

PRESSED PONTIANAK. Jelutong rubber containing no kerosene or earthy matter. See Pontianak.

PALEMBANG. See Pontianak.

PAMANOEKAN BALLS. A name for Java rubber. See Assam.

PHILIPPINE. Rubber which is the product of a vine, the *Chonemorpha elastica* found in Tawi-Tawi, Basilan and Mindanao. The latex is coagulated by adding sea water. The rubber is tacky and grades the same as No. 1. Borneo.

RANGOON. Ficus rubber shipped from Rangoon. See Assam.

RAMBONG. The native name for Ficus rubber from the Straits Settlements and Federated Malay States. See Assam.

SUMATRA. See Assam.

SARAWAK. See Pontianak.

TAWI-TAWI. See Philippine Rubber.

WHITE ASSAM. See Borneo.

PLANTATION RUBBER

Grades of plantation rubber which could be counted on the fingers of one hand a few years ago are now numbered by the score. Theoretically there should be but a half dozen from planted Hevea and about three each from cultivated Manihot, Castilloa and Ficus. Differences in gathering and in coagulation, the careless work of small native planters, the mixing of wild rubbers with cultivated, and the arbitrary creation of new grades all add to the confusion.

The segregation of plantation rubber into grades is done in part at the plantation and finished by the exporters and importers at rubber centers such as Singapore, Batavia, London and New York. The basis of grading is color, dryness, cleanness, hardness and freedom from blemishes of any sort.

The general sorts are crêpe and sheet. Crêpe comes in eleven grades with names that very nearly coincide in the principal markets. Sheet, smoked and unsmoked, comes in three principal grades from the big plantations, but in a great variety of grades from the small native plantations.

The following arrangement is an attempt to give to most of the existing grades some sort of coherence. The sources of information are various growers and importers of rubber, United States commerce reports, British and Dutch government reports, together with the work of John A. Fowler and Dr. P. Arens. Unless otherwise specified all of the grades mentioned below consist of Hevea plantation rubbers.

ANTI-COAGULANTS. Chemicals employed to prevent coagulation in the field or before the addition of the proper coagulant. As formaline, sodium sulphite, etc.

[1]Continued from THE INDIA RUBBER WORLD, March 1, 1921, pages 404-405.

ACID-CURED RUBBER. Latex which has been coagulated by means of acetic or other acid. Not to be confused with the acid-cure of vulcanizing.

AMBER CRÊPE. New York rubber market term for rough, thick, light-colored crêpe graded as No. 1 amber; No. 2 amber; No. 3 amber (medium color) and No. 4 amber (dark and often mottled). See Crêpe.

BARKY OR BARK. Singapore term for low grade crêpe. See Crêpe.

BARK CRÊPE. Batavia rubber market grade of crêpe. See Crêpe.

BATAVIA CLEAN SCRAP. Lower grade than amber crêpe containing woody particles, etc. See Crêpe.

BLANKET CRÊPE. A thick crêpe made by rolling together several layers of thin crêpe while warm from smoke-house or vacuum dryer. See Crêpe.

BATU PAHAT SHEET. Singapore term for rubber from the district of that name. Color varies from light to dark, usually softening, weakening and darkening after crêping. It makes up into type *C* of Singapore standard blanket crêpe.

BISCUITS. Flat pancakes of rubber built up in thin sheets in concentric layers of nearly circular form and from 1/16 to 1/8-inch thick, 10 to 14 inches in diameter. Made from latex coagulated in shallow pans, rolled, dried and smoked.

BLOCK. Sheets, biscuits and other forms of rubber made from latex coagulated in mass and pressed into slabs by screw or hydraulic force and averaging 10 by 10 by 6 inches.

BROWN CRÊPE. A Singapore low-grade crêpe, having barky particles and often tearing easily. See Crêpe.

BASILAN. Plantation Hevea rubber from the island of that name in the Philippines.

BRANDS. As a guide to quality, producers' brands are much used. Names of the companies as a rule form the brands, and may have an English origin, as Dalkeith or Vallambrosa; a native local name, as Lumut or Siak; or in the Dutch possessions a Dutch name as Daejan. The entire output of many estates is purchased under estate brands by individual manufacturers and thus never appear in the open market.

CLEAN SCRAPS. Batavia grade. See Crêpe.

CEARA PLANTATION. Rubber derived from the Manihots, produced in Ceylon, Malaya and in some of the former German Colonies in Africa. Prepared in crêpe, sheet, and scrap, similar to Hevea plantation rubber.

COAGULATION. The process of separating and agglutinating the caoutchouc globules in the tree milk usually effected by acetic acid treatment.

COAGULANT. An agent or substance used in coagulating latex.

COLOMBO SCRAP.—Plantation scraps massed, consisting of clear light-brown strings and bits, usually bark-speckled, in No. 1 and No. 2 qualities.

CRÊPE. Sheets of rubber with irregularly crimpled or crinkled surfaces, 3 to 6 feet long and 5 to 12 inches wide. It is made from latex coagulated in bulk, passed through washer rolls and while being thus wrung is crimpled by the grooved rolls. It is then thoroughly dried and sometimes smoked.

Crêpe is graded chiefly in New York, Singapore and Batavia. A clear pale color characterizes the highest grade which is called in New York standard quality first latex, or first latex; in Singapore, standard quality pale; in Batavia, standard first latex; and in Java, fine pale and prime pale. The next grade, due to a difference in color, is known in New York as off standard or off color latex; in Singapore, off-color latex and palish crêpe; in Batavia, off-color crêpe, and in East Java, "P" red prime crêpe and "L. B." crêpe. A third grade is known in New York as prime clean light brown; in Singapore, fine brown; in Batavia, lump; and East Java "L. B." red. The next grade in New York is medium-color brown and good dark brown; in Singapore, brown and dark; in Batavia, clean lumps; and East Java, "D" dark, "D. G." dark gray, "D. D. G." red.

These are followed by the blanket crêpes known in the New York market as Nos. 1, 2, 3 and 4 amber; in Singapore as types *A, B, C, D,* blanket. This in turn is followed by the New York term, specky brown crêpe; Singapore, bark or barky; Batavia, barky specky scrap or bark crêpe, and East Java, scrap. Then comes the grade known in New York as massed or rolled crêpe; Singapore, earth or rolled bark crêpe; East Java, scrap.

COAGULUM. Freshly coagulated latex in mass.

COMPOUND RUBBER. Rubber made up of lump, scraps, bark rubber and wash-water scrap, etc.

CUP SCRAP. See Dry Tapping.

CURING. A common term for coagulating rubber. See Coagulating.

CASTILLOA. Product of cultivated Castilloa. When washed on rolls after coagulation it comes as sheets and scrap. When coagulated by centrifugal force it comes in the form of truncated cones weighing from 10 to 25 pounds. Comes chiefly from Trinidad and Mexico.

CONGO. Product of cultivated Hevea from the Belgian Congo.

BJAMBI. Sheet rubber from Bjambi, Malaya, from native plantations. Usually soft and dark and with much moisture, showing a shrinkage of 8 to 11 per cent on crêping. It makes up into average soft, dark blanket crêpe of the Singapore types *C* and *D*, mostly the latter. See Sheet.

DIAMOND SMOKED SHEETS. Singapore and Batavia grade of best sheet. See Sheet.

DRY-TAPPING. Refers to the practice of allowing the latex that adheres to the latex cups to remain and air-coagulate, instead of rinsing the cups with water. The thin films are collected separately and form cup scrap.

DRY RUBBER. A somewhat elastic term meaning generally the presence of less than 1 per cent of moisture.

DRYING. Removing moisture from rubber by exposure to air at normal temperature, or by heated air, or by mechanical dryers, as vacuum dryers.

DILUTED LATEX. Latex to which pure water is added bringing the dry rubber content to 15 per cent, as is practiced in making sheet.

EARTH CRÊPE. A Singapore low grade rubber made from latex that has dripped upon the ground. Also rolled bark crêpe. See Crêpe.

EAST JAVA PRIME PALE CRÊPE. See Crêpe.

EARTH RUBBER. See Crêpe.

ESTATE OUTPUT. A Batavia grade which consists of about 75 per cent of fine pale crêpe or prime smoked sheet and 25 per cent of the lower grades from off-color crêpe and off-quality ribbed smoked sheet to earth.

EAST AFRICAN. See Uganda.

F. A. Q. RIBBED SMOKED SHEET. A Singapore term for a clean, tough rubber free from mould, dampness or under or oversmoked sheets. See Sheet.

FIRST LATEX. A term referring to latex free from débris, clots or rain water.

FINE PALE CRÊPE. A Batavia supergrade crêpe. See Crêpe.

FINE BROWN CRÊPE. A Singapore term for crêpe made from latex coagulated in the cups. See Crêpe.

FINE MEDIUM SMOKED CRÊPE. See Crêpe.

FINE SMOKED RUBBER. A general term for high quality smoked-cured sheet. See Sheet.

FIRST LATEX CRÊPE. The finest grade of plantation Pará; a thin or thick pale, clean sheet of even color, free from all traces of oxidation and well prepared by acid coagulation. See Crêpe.

FIJI. Plantation Pará from the islands of that name.

FLAKE. Rubber in thin, flattened irregularly shaped scales.

FORMAL RUBBER. Funtumia rubber coagulated by formaldehyde.

FUNTUMIA RUBBER. Funtumia rubber coagulated by boiling with an infusion of the twigs and leaves of native vines.

(To be continued)

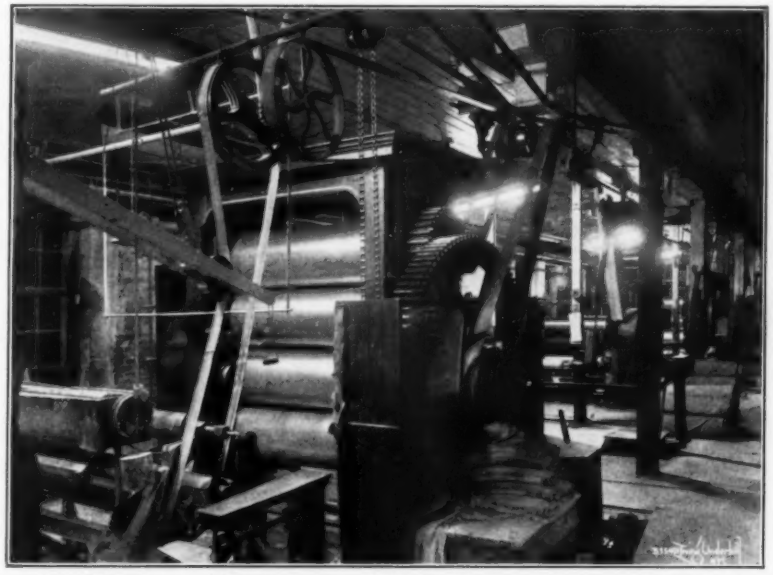
Artificial Lighting in the Rubber Industry—IV[1]

By E. Leavenworth Elliott

General Conditions to Be Considered in the Lay-out

IN LAYING OUT a heating system the first question is: What temperature must be maintained? Having decided this, the amount of heat required is found by considering the volume of space to be heated; then, the amount of heat given off by a given radiating surface, such as a steam coil, being known, the total area of radiating surface is easily determined. In figuring out the quantity of heat required certain general conditions other than the cubic contents of the room must be considered, such as the rate of change of air for ventilation, the minimum outside temperature, the conductivity of the walls, etc. The influence of these factors is more a question of judgment based on experience than of mathematical calculation. Lastly, having determined the total amount of radiating surface, the method of locating it so as to secure the most uniform temperature through the space must be worked out.

The lay-out of lighting installation is a somewhat similar problem. The first question is: What degree, or intensity, of illumination is required? This will naturally depend upon a number of conditions, such as the character of the materials, the accuracy of the work, the color of surrounding walls, etc. It is not so generally known that the quality of the light is also a large factor in this determination; but before we discuss this in detail it will be well to consider the general problem.



A GOOD EXAMPLE OF MILL LIGHTING BY COOPER-HEWITT LAMPS, THE LAMPS BEING LOCATED TO GIVE THE BEST ILLUMINATION ON THE MACHINES

Having decided upon the intensity of illumination needed, the size and location of the light-units may be determined; and from this data the total quantity of light, and the corresponding amount of electric current required, can be reckoned.

It is a curious fact that, in all the scientific investigations that have been carried out, and all the theoretical work that has been done to put the use of light on an engineering basis, all answers to the first, and most important question, have been merely so many broad guesses. Extended lists of operations with the intensity of illumination required for each have been published; but the wide differences in the figures are in themselves sufficient evidence of the uncertainty of their authority. As to what precise methods were used to determine them the authors are discreetly silent. The preceding tabulation of operations pertaining to another industry may be cited as an example.

It is a familiar fact that the eye can function through an enormous range of light intensities. From dim starlight to full sunlight represents a difference of more than a million to one in brightness. The question is not whether an operative can see to work, but can he see to work with his greatest efficiency? Reduced to a scientific basis, which is also the common-sense basis, the rule is this:

Such a degree of illumination must be provided, the quality of the light and all other conditions affecting vision being considered, that the muscular motions which depend upon sight for their guidance can be made with the greatest speed and accuracy of which the individual is capable under the circumstances in each case.

Or to put it the other way around: the workman must not be hindered in the slightest degree by the illumination. The problem is to find the minimum intensity required: this can be exceeded by several hundred per cent without interfering with the desired result; but to use an excess of material or power is not good engineering—in fact, it is not engineering at all, but only guesswork. The extent to which excess is avoided measures the value of the engineering skill applied.

Seeing involves the recognition and discrimination of the various parts and features of the objects seen. In a general way the effectiveness of sight depends upon the amount of light reflected from the object; in other words, its average surface brightness. It is like timing a photographic exposure, which is based upon the general brightness of the field. It needs no elaborate scientific formula to tell you that more light is necessary to see dark-colored objects plainly than to see light-colored objects; also, that more illumination is needed to discriminate objects between which there is little contrast in brightness.

Recent experiments show that the intensities formerly given for different classes of work are much too low, at least in the cases where sharp vision is required. The most accurate and reliable experiments of this kind, the results of which have not yet been published, show that, in the case of average sharpness of vision, such as that required to read printing the size of this

ILLUMINATION REQUIRED FOR TEXTILE PROCESSES

Cotton	Foot-candles: Light goods	Foot-candles: Dark goods
Opening and lapping	2-6	2-6
Carding	2-6	2-6
Drawing frame	2-6	2-6
Roving, spooling, spinning, etc.	3-9	3-9
Warping	2-6	2-6
Slashing	2-6	2-6
Drawing-in	3-9	3-9
Weaving	3-9	3-9
Dyeing	3-9	3-9

[1]Continued from THE INDIA RUBBER WORLD, March 1, 1921, pages 412-416.

line, eight point, and with the maximum contrast—black on white—and with no disturbance from glare or scattered light in the eye, a minimum illumination of 10 foot-candles is required; 20 foot-candles giving even a slightly higher visual efficiency. This is more than five times the minimum intensity given in the list of operations in cotton goods manufacture, in which the conditions for discrimination are very similar to those in reading print.

An equally interesting and important fact is the difference in visual efficiency due to difference in the quality of the light, evidently due to the difference in the sharpness of the retinal image by light of different color composition, as explained in the preceding article. According to the experiments just referred to, the relative values of the three available sources of light, viz., daylight, incandescent electric light, and mercury-vapor light, at 5, 10, and 20 foot-candles intensity, reduced to a scale in which 10 foot-candle daylight is taken as the standard, or 100 per cent, is as follows:

	Daylight	Incandescent Electric	Mercury Vapor
5 ft.-can.	95.3	91.5	101.0
10 ft.-can.	100	97.1	106.2
20 ft.-can.	101.4	98.9	107.3

The experiments by which these values were obtained included not only the discrimination of objects in seeing, but the time required to make a muscular action in response to the visual impression, which is exactly what takes place in all manual labor that it directed by sight. The figures thus represent the actual labor-output values of the different lights and intensities.

These figures show that for all work requiring close vision and sharp focussing, at least 10 foot-candles illumination should be provided, and that at this intensity mercury-vapor light is 9 per cent better than incandescent electric, and 6 per cent better than daylight, measured in labor efficiency.

In the case of the coarser grades of work, where close vision is not required, no equally reliable data are at hand. Two general facts, however, will afford some help in forming a judgment in such cases: first, the difference in cost due to a difference of 5 foot-candles in illumination is insignificant in itself, and still more so in comparison with the cost of labor; and second, there is no danger of loss in efficiency from too much light, if it is of the right kind. A minimum of 5 foot-candles may therefore be taken as a safe figure for all cases of rough work, i.e., where the objects seen are not ordinarily closer to the eye than arm's length.

There is but one other general case to be considered; that of spaces in which no work is regularly done, such as storage rooms for raw and finished products, or the intervening spaces between machines. In the former, continuous lighting may not be necessary, but only a working intensity required locally on occasion. In the latter, a sufficient intensity to avoid any possibility of accidents from imperfect visicn is the chief requirement. One foot-candle may suffice, but two is a safer amount.

There remain, then, only the special cases where unusually exacting work, like die sinking, is done, in which case 20 foot-candles is a fair minimum.

Knowing the degree of illumination required, the next question is, how to secure it. This problem involves two factors: the size of the light-unit, and its position in the space to be lighted. These two factors, when taken in connection with a number of conditions which effect the final result, afford an opportunity for endless mathematical calculations; and the vast amount of work that has been expended in this way is chiefly impressive for the inutility of the results obtained.

When reduced to its lowest terms of practicality, the problem is simple enough. To begin with, we have a light-unit, i.e., a lamp and its accessory apparatus for diffusing and reflecting light, which distributes its light in a certain manner, which is usually shown by a curve supplied by the makers. It follows that there will be as many different kinds of distribution curves as there are different kinds of reflectors and globes; but the problem has been greatly simplified by the narrowing down of the choice of light-units to two types: the Cooper-Hewitt lamp, and the gas-filled tungsten filament lamp, known in the trade generally as the "Mazda C," equipped with a white-enameled steel reflector, commercially known as an "R. L. M. reflector." This reduction of practical industrial lighting units to two types is the combined result of the process of elimination by which the fittest survives, and the American tendency to standardize. The Cooper-Hewitt lamp is regularly produced in one size, though a half-size lamp may be had on special order; the Mazda C unit may be had in a variety of sizes. The distribution curves of these two are so near alike that they may be treated as identical, as shown in Fig. 1.

"Curves" are now so frequently used to show the relation between variable quantities that a very brief explanation will be sufficient. In these curves the light-source is at the center, or "origin," and the candle-power intensities at different angles are measured off on radii from this point. In the case of the 500-watt, bowl frosted tungsten lamp shown, the intensity directly underneath is 1,500 candle-power; at 45 degrees it is 1,300 candle-power, and is cut off entirely at 15 degrees below the horizontal. The curve of the Cooper-Hewitt lamp taking 430 watts is practically the same, the difference being too slight to be recognizable in the illumination produced.

These curves deal with intensities of *light;* the problem is to select units of such size, and to place them in such positions that the desired intensities of *illumination* may be secured.

The intensity of illumination produced upon a given surface by a given light-unit depends upon three things: (1) the candle-power intensity of the light-beam; (2) the distance of the surface from the source; and (3) the angle at which the rays strike the surface. The first and second of these laws we have already discussed; let us now examine the third.

A beam of light, L-ABCD, from a source at L, will cover the surfaces S, S′ and S″, which become larger as their inclination

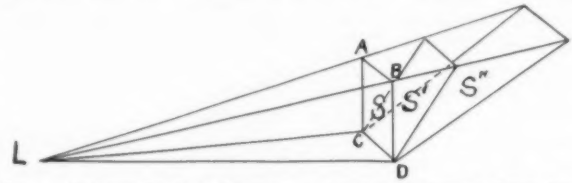


FIG. 1. DIAGRAM SHOWING INCREASE OF SURFACE COVERED BY GIVEN BEAM OF LIGHT AT DIFFERENT ANGLES OF INCIDENCE

becomes greater; and as in the case of the distance, or inverse-square law, the *greater* the surface the *less* the illumination. Expressed mathematically, the intensity varies as the sine of the angle of incidence. If this happens to be beyond your familiarity with mathematics, don't worry; the figures have been all worked out by the lamp makers, and you can use them for your estimates, just as the banker uses his interest tables instead of making laborious calculations of his own.

In figuring illumination the question naturally arises: what surface is to be taken, the horizontal, the vertical, or the surface perpendicular to the light-beam? In the actual use of light for seeing things, all three of them, and every position between, come into play; but for the purpose of estimating the size and position of light-units—and any calculations of this kind are only estimates, or indicators, at the best—the horizontal surface is usually taken as the standard, and is assumed to be 30 inches from the floor.

Uniform illumination on this imaginary plane is generally considered the 100 per cent perfect result. But perfection in light distribution is as difficult of realization as perfection in human nature, and far less to be desired. The practical object, and one which is easily within reach, is to have not less than the minimum intensity required, at every place in the room, and to avoid too large an excess above this amount.

In considering the distribution of light over a horizontal surface the most obvious fact is the way in which all conditions work together to produce the greatest intensity directly under the unit: thus the candle-power intensity is greatest in that direction, the distance from the source is the shortest, and the inclination of the surface least, in fact, zero. As we move out from this position the intensity falls off very rapidly; at a

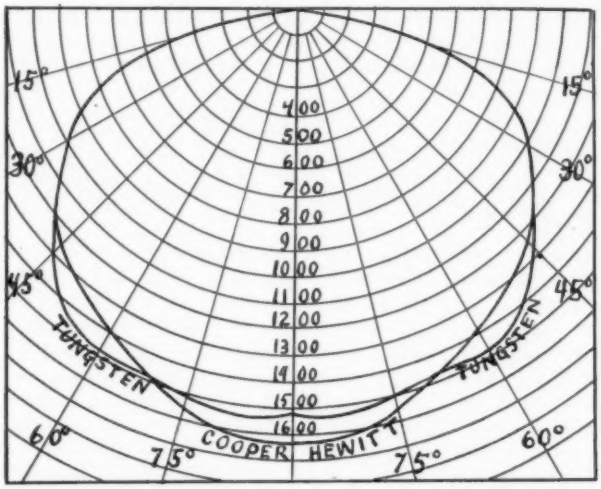


FIG. 2. CURVES SHOWING DISTRIBUTION OF LIGHT BY THE TWO UNITS BEST ADAPTED TO FACTORY LIGHTING. THE "MAZDA C" LAMP WITH "R. L. M." REFLECTOR, AND THE COOPER-HEWITT LAMP

distance equal to the height of the unit it falls to one-fourth, and at twice this distance of one-sixteenth, and at an equal rate beyond this. The foot-candle intensity directly underneath is found by squaring the height of the unit, measured in feet, and dividing the candle-power by this product. Example: If the 500-watt Mazda unit is placed 10 feet above the floor, the foot-candle intensity directly below is $1500 \div 100 = 15$ foot-candles. At ten feet from this spot it is ¼ of 15, or 3¾ foot-candles, and at 20 feet, 1/16 of 15, or 15/16 foot-candle, reckoned by the mathematical laws which apply in the case.

These figures are for the simplest case; that is, where a single unit is used. When more units are used to light the same surface the resulting illumination is, of course, the sum of the intensities produced by all the units used. Mathematically, the problem of figuring the resulting intensity becomes greatly complicated in the case of a number of units; but practically it is very simple. The amount of light received by units beyond those next to a given unit is so small that it may be left out of the reckoning entirely. For all practical purposes the following rules are sufficient. When the units are spaced at distances equal to their mounting heights the illumination will be uniform. When spaced at twice the mounting height the minimum illumination, midway between two adjacent units, will be one-half the maximum, or underneath intensity. Spaced at three times the mounting height the minimum will be one-third the maximum.

From the candle-power, or distribution curves, or the intensities which they represent, and these few computations by simple arithmetic, all the information as to foot-candle distribution that is worth having may be quickly obtained. Variations due to deterioration in use, accumulations of dirt on lamps and reflectors, reflection from walls and other surfaces, will far exceed any discrepancies arising from mathematical inexactness in these calculations.

Having decided upon the intensity of illumination to be supplied, either on the basis of uniformity, or of a given minimum, it is a simple matter to determine the size of units, and the spacing distance required: and from this data the total amount of current, and the ratio of current to floor space, is quickly reckoned. Thus, if a uniform illumination of 10 foot-candles is desired, it may be obtained by using either the 500-watt Mazda C units, or Cooper-Hewitt lamps, hung 12 feet high and spaced 12 feet apart. There would then be one unit or lamp to each 144 square feet, which would be at the rate of 3½ watts per square foot for the Mazda unit, and 3 watts per square foot for the Cooper-Hewitt lamp. If the ceilings are too low to admit of the 12-foot hanging, or if conditions are such that a lower hanging is practicable, they may be hung at 10 feet, which will give 15 foot-candles underneath, and with 20-foot spacing, 7½ foot-candles minimum, with a rate of 1¼ watts per square foot for the Mazda, and 1 watt per square foot for the Cooper-Hewitt. If a 10 foot-candle minimum is desired, the spacing can be reduced to 15 feet, which will give a rate of 2 watts per square foot for the Mazda, and 1.9 watts for the Cooper-Hewitt. Smaller units may be used, but their distribution is the same, and the methods of figuring will be the same, with the substitution of the smaller candle-power values, which are supplied by the lamp makers.

The method may seem very haphazard and unscientific to the professional engineer; if so, then there is plenty of opportunity to manipulate mathematical formulas for those who are so disposed: but the average factory manager probably would sooner spend his time playing solitaire, which would be quite as valuable an occupation so far as practical results are concerned. There are several published volumes of which this subject occupies the major portion. Never was so much perfectly good mathematics squandered to so little purpose.

There are two ways to lay out a lighting installation: to locate the units with reference to the structure of the building; or to locate them with reference to the machinery or the positions which the workmen occupy. There would seem to be little doubt as to which method would produce the better results, measured in labor efficiency: and yet most new installations are planned by the former method. Having produced uniform illumination over the theoretical "working plane"—on which no work may ever be done—the job is considered a fine piece of "engineering"—by the engineer. Architects have a cheerful way of lighting two kinds of the rooms in which the manner of lighting is most important, kitchen and bedrooms, in such a way that it is impossible to see plainly and comfortably what you most need to see. A single unit is placed in the center of the room; and as the tables, sink, stove, cupboards, etc., are around the walls of the kitchen, and the bureaus and mirrors similarly placed in bedrooms, you invariably "stand in your own light," that is, your own shadow is upon the very thing that you most want to see. And yet the illumination of the room is fairly uniform, and may be of ample intensity, thus fully satisfying "engineering" requirements. The best laid plans of blueprint installations "gang aft a-gley" for similar practical reasons.

We discriminate in seeing by differences in brightness, or in more familiar terms, by differences in "light and shade." A surface of uniform brightness appears perfectly flat. A light that was perfectly uniform and perfectly diffused would be about the worst possible light to work by. The best possible illumination is one in which the shadows are sufficiently light to reveal all details, and yet in which there is a sufficiently strong light from some one direction to bring out distinct contrasts. Nothing is more confusing than multiple shadows,—the result of "cross lights," which have long been recognized as serious evils. The ideal method of illumination is, therefore, to light each piece of work in the manner just stated, so as to bring out all the details as sharply as possible, and to handle the light-units in such a way as to avoid glare and scattered light in the eye of the workman. This can only be accomplished by careful consideration, and often by actual experiment, of the particular conditions arising in each case. We shall study some of these cases in our next article, in connection with typical rubber factory lighting installations, which will conclude these papers.

SUMMARY

The intensities of illumination required for various industrial purposes have generally been far underestimated in published works on the subject. The most recent and reliable investigations show that a minimum of 10 foot-candles should be supplied for close work. One-half of this amount should be furnished for coarse work, and from one to two foot-candles for general safety in all spaces regularly used by workmen.

Mercury-vapor light enables the muscles to respond more quickly to vision and brings out details more sharply than either daylight or ordinary electric light.

There are only two types of light-units to choose from for factory use: the gas-filled tungsten lamp with white-enameled steel reflector, and the Cooper-Hewitt lamp. These distribute their light in the same manner, so that the same rules apply to both in figuring a lay-out.

These units, when spaced at distances equal to their height, give uniform illumination on the floor. At twice this distance apart the illumination midway between the units is one-half what is directly underneath; and at three times the distance, one-third.

The foot-candle intensity directly underneath may be found by squaring the height of the unit in feet, and dividing the vertical candle-power intensity by this product.

The intensity of illumination on the floor produced by a single unit is found as above for the point directly below; at a distance from this point equal to the height it is one-fourth as much, and at twice this distance, one-sixteenth as much. The above two rules will give sufficient data for figuring any lay-out with the units described.

The best distribution of illumination is one in which there are no shadows so dark as to prevent seeing details, and which gives such degrees of light and shade, or contrast, that all details can be sharply discriminated

RUBBER SHOE SOLING

By B. W. Elberson

IN THE COMPOSITION of rubber shoe soling there is generally a predominating proportion of reclaim in the mixing, enough crude rubber being added to ensure a measure of wearing quality. Formerly the only reclaim used for this purpose was that derived from reworking waste rubber from worn-out shoes.

Since the great influx of reclaim from automobile and solid tires these grades have found a place in rubber sole composition and have improved the wear resisting quality of the product. Plantation Pará in the inventories of rubber manufacturers at 27 cents per pound, suggests the possibility of again using the better formulas of forty years ago. In these mixings crude rubber predominated rather than reclaimed rubber.

SOLING STOCK IN THE FACTORY

The usual method of preparing soling in a rubber shoe factory is to allow an interval of 24 hours between mixing and calendering. The latter operation is accomplished with a small four-roll calender of special design, one roll bears the knurling for heel and forepart of the sole, these are separated by a smooth shank interval bearing the brand of the manufacturer. The knurled roll is suitably turned to give the desired variations in gage of the soles.

TUBED SOLING

In European factories soling has been run by means of the tubing machine, the cylinder of stock extruded being cut and laid open as it emerges from the die, and the knurling effected by passage of the stock through a pair of rollers close to the die of the tubing machine.

Better quality stocks are handled somewhat differently from reclaim grades. For best results with good grades, batches should be cooled after mixing and be allowed to rest for two or three days before calendering. Otherwise the stock will work up too soft, and blistering and undercuring are liable to result. On the other hand, if insufficiently ground, soling will not calender smoothly and will shrink several gages on cooling. Judgment and care are necessary to maintain the medium condition of softness, bearing in mind that the harder the stock when delivered to the heater the firmer will be the cure.

HANDLING SOLING

Calendered sheet soling is usually cut in short lengths, received on convenient thin boards with end cleats for separation in piling, and the piles set aside for 24 hours of cooling before cutting up.

SOLE CUTTING

In small factories or for small quantities of soles needed in large factories, soles are usually cut by hand, using sheet metal patterns as a guide. For large output the sole-cutting machine has become indispensable, owing to the advantage of speed attained.

DELIVERY OF SOLES TO SHOEMAKERS

It is impractical to bunch cut soles on boards for delivery to shoemakers; instead it is customary to use cloth leaf books for this purpose, which are transported on edge in trucks, to avoid pressing and adhesion in the book.

These books are on a board, and have eighteen or twenty leaves of canvas and a black-rubber top leaf for chalkmarking. In the making room the operative is not allowed to use cement. A cup of naphtha and a brush to do the "gassing" will produce enough adhesion for quick rolling on. This touching up is done while the soles are in the book, the leaves of which become so sticky after a time that they occasionally have to be dried out in the heater.

ROLLED-EDGE SHOES

A large percentage of goods are made rolled-edge, which necessitates the stock being cut face down, and therefore the back of the sheet must be marked to show the position of the brands and heel line. A small wheel may be used for this purpose, resting on the engraved roll and held in position by a hinged arm attached to the calender frame. The wheel has a couple of brands on its face spaced exactly like those on the roll; these and the heel line are slightly raised, which makes the impression.

VULCANIZING

Of the several methods of vulcanizing, the pressure-cure is the best for heavy work, as the heat penetrates the goods, and pressure ensures a strong union between the shoe upper portion and sole. Red, maroon and white stock should be pressure-cured, although maroon can be compounded with some litharge and will then cure fairly hard in open heat.

SERVICE

If goods are to give longer service the bottoms must be of more durable stock. An examination of a pile of worn-out shoes will show that a large number were discarded because of leaky soles; generally the heels wearing through first. This is a very noticeable defect in women's shoes. If a ply of good quality and thickness of rubber were added, in making up, it would prevent leaking, even after the regular heel had worn through.

"ENGLISH WEAREVER" RUBBER SPONGE OF NATURAL COLOR

A rubber sponge that is a very good imitation of a natural sponge both in color and porosity is the "English Wearever," recently developed by an American manufacturer of rubber sundries and specialties. This sponge is much firmer to the touch than the ordinary red rubber article. Its natural light tan color is very attractive. It has not the unpleasant, slimy feeling often objected to in rubber sponges when used with soapy water. The porosity is irregular as in a natural sponge and it has unusual absorbent qualities.—The Faultless Rubber Co., Ashland, Ohio.

Solvents and Thinners Used in the Rubber Industry[1]

By Frederic Dannerth, Ph.D.

A Study of Specifications, Technical Properties, and Methods of Testing, Volatile Organic Solvents

IN THE RUBBER INDUSTRY the use of thinners, or volatile solvents is a primary requirement in the process of spreading, in the vapor vulcanization of rubberized and rubber-coated fabrics, in the preparation of dipping solutions which contain sulphur chloride, and in the preparation of cements used in connection with many different "building-up" processes. As examples of these built-up articles, we have such druggists' sundries as hot water bottles and fountain syringes; raincoats and rubber footwear; power transmission belting and rubber hose. Solvents are also used for the purpose of cleaning surfaces before rubber or rubber compounds are applied. These "wiping liquids" are used in the manufacture of auto tires, as well as rubber-covered rolls.

SPECIFICATIONS

In writing specifications for volatile solvents or thinners, it is desirable and necessary to take into consideration the effect which the operator seeks to attain—the effect of the solvent on rubber and rubber compounds, as well as the effect of the solvent on the workers. The questions which the buyer and the factory superintendent must therefore keep in mind are these:

1. Is it non-toxic? Will it injure the worker either externally or internally? Will it shorten his life?

2. Is it non-corrosive? Will it attack any cans, tanks or drums in which it may be stored or transported?

3. Has it the proper "speed of evaporation"? Will it evaporate before it has accomplished its purpose, or will it remain as an oily deposit after it has done its work?

4. Has it a definite boiling point, or is it a mixture of various solvent liquids which boil at different temperatures?

5. Does it contain any "high-boiling residues" such as are contained in raw petroleum before it is refined? If the solvent is to be used as a wiping fluid this is an important consideration because any grease or oil content would interfere with the adhesion of the rubber compound.

6. Is it non-inflammable? This factor will, of course, affect the fire risk and determine the amount of insurance premium demanded by the insurance companies. Solvents having a very low "flash point" will, as a rule, be prohibited by the authorities, and, on the other hand, they will generally be found to be unsuited for use in any of the operations mentioned above.

7. Is it odorless? Foul smelling liquids and those which irritate the membranes of the eye and nose will interfere with the efficiency of most workmen. For that reason an odorless liquid would be preferred to those having a foul, pungent, irritant, caustic, disgusting, offensive or other unpleasant odor.

8. What is the solvent or the swelling power which it possesses for rubber? If a cubic inch of fine Pará rubber is immersed in the solvent for 60 minutes, what change in size, shape or condition is noticeable?

9. What is the price of the solvent or thinner per gallon in original packages, F. O. B. your factory?

GLOSSARY

GASOLINE. The refining processes of the petroleum industry consist for the most part of washing and distilling. The crude oil is then, one might say, analyzed on an industrial scale into its component parts. And this is possible because each part boils at a different temperature, just as we find that a teaspoonful of ether and a teaspoonful of water will not evaporate with equal rapidity.

The type of gasoline or light naphtha used in the preparation of cements and dough for rubberizing is preferably not heavier than 0.730 specific gravity, with a boiling point of 50 degrees to 150 degrees C. (122 to 300 degrees F.). Municipal fire laws usually require the user of gasoline to bury the storage tanks so far below ground level as to keep the tank cool and prevent the access of flames or electricity. Workmen should remember that the vapors of gasoline are heavy and are therefore more dense near the floor, that the sense of smell tires very quickly, and for that reason they may suddenly find themselves overcome by the vapors unless proper ventilation has been provided. The matter of correct and active ventilation is then one of the principal safeguards which must be adopted wherever this solvent is stored or used or evaporated.

COAL-TAR BENZENE. This is a refined oil obtained from the light oil of coal-tar by fractional distillation. It boils at a constant temperature of 81 degrees C. (= 177 degrees F.) and contains no high boiling oils, such as is the case with gasoline or petroleum naphtha. Some factory superintendents claim that it is undesirable because it evaporates all at one temperature. In 1902 Carl Otto Weber expressed the opinion that "for most practical purposes the use of a homogeneous solvent having a constant boiling point, results in solutions or doughs which dry from the surface. This yields harsh and rough coatings, and in the

TABLE SHOWING PROPERTIES OF THE PRINCIPAL VOLATILE ORGANIC SOLVENTS

Solvents	Specific Gravity	Pounds Per Gal.	Price, Cents per Lb.	Price, Cents per Gal.	Boiling Point Deg. C.	Boiling Point Deg. F.	Flash Point Deg. C.	Chemical Formula
Gasoline 65° Bé.	0.718	5.97	..	38	95% below 150°	302	Below 0	Hydrocarbons C_nH_{2n} plus C_nH_{2n}
Benzene pure	0.880	7.33	..	30	81-82	178	Below 0	C_6H_6
Benzene 90%	0.870	7.24	..	30	Dry at 120°	248	Below 0	Benzol, Toluol
Coal-tar naphtha, 160°	0.860	7.15	..	28	90% below 160°	320	22-26	Benzol, Toluol, Xylol and Cumol
Turpentine	0.870	7.24	..	58	160-170	338	34	$C_{10}H_{16}$
Acetone	0.800	6.66	14	93	57-58	137	Below 0	CH_3CH_2CO
Methanol, 95%	0.817	6.80	..	130	66	150	12	CH_3OH
Denat. grain alcohol, 190 proof	0.816	6.79	..	70	79-80	175	12	C_2H_5OH + denaturant
Butyl alcohol	0.815	6.78	32	32	115-117	240	.....	$CH_3(CH_2)_2CH_2OH$
Fusel oil refined	0.820	6.83	..	360	100-140	284	.....	Amyl, propyl, iso-butyl alcohols, etc.
Carbon disulphide	1.292	10.76	8½	92	46-47	115	Below 0	CS_2
Carbon tetrachloride	1.630	13.57	12	163	77	171	None	CCl_4
Tri-chlor-ethylene	1.470	12.20	15	183	88	190	None	C_2HCl_3
Tetra-chlor-ethane	1,600	13.28	16	212	147	297	None	$C_2H_2Cl_4$
Water	1.000	8.33	..	30/1000	100	212	.....	H_2O

case of waterproof cloth, the finished cloth will curl toward the rubberized surface." Obviously the outer layer or surface of rubber coating will dry before the lower or inner layer has a chance to dry. The surface layer contracts long before the solvent has left the lower layer, and the cloth wrinkles, warps or "cockles," as the workers say.

As a thinner or solvent for sulphur chloride, coal-tar benzene is, however, used successfully to a large extent today.

SOLVENT NAPHTHA. The oil obtained from coal-tar might better be called "160-degree coal-tar naphtha." It consists of a mixture of benzol, toluol, xylol, styrol and pseudo-cumol, so that 90 per cent boils below 160 degrees C. (320 degrees F.). This material resembles gasoline in that it boils over a wide range and for that reason it does not evaporate superficially as does benzene. On the other hand, it boils similarly to turpentine (160 to 170 degrees C.), and for that reason it has been used as a substitute for turpentine in many cases where thinners are needed. In England and Europe the oils obtained from the distillation of coal-tar have for years been the logical solvents and thinners for the rubber industry because of the lack of extensive petroleum deposits.

Numerous experiments have proved that rubber which has been thinned down with "volatile solvents" loses much of its value when it is recovered from the cement thus formed. The rubber remaining after evaporation of the "solvent" has lost considerably in tensile strength. Now it is also found that the loss in tensile will vary with the "solvent" which has been employed. This may be due in a measure to the fact that the distribution of resins in the rubber has changed, or a residue of very high boiling oil has been left in the rubber after the major portion of the "solvent" has disappeared. The coal-tar naphtha at present on the market in America is of such a quality that the impurities which were mentioned in specifications twenty years ago have now practically disappeared. The one thing which should invariably be given consideration is its boiling point and the (volume) percentage which is non-volatile at 160 degrees C. (320 degrees F.).

CARBON DISULPHIDE. Because of its ability to dissolve large amounts of sulphur, this material was one of the first to be used as a solvent and thinner in rubber work. Virtually all of the carbon disulphide used in America today is made in special electric furnaces. One shaft of the furnace is kept filled with charcoal, while the outside ring contains sulphur. The hot vapors of sulphur rise and pass through the heated charcoal, forming vapors of carbon disulphide, which are then piped off and condensed. The material has a boiling point of 47 degrees C. (116 degrees F.) and its vapors are unusually heavy. This, coupled with the fact that it is highly inflammable, makes it so undesirable that its use is extremely limited at the present day in all plants where scientific management is used. Up until about 1910 it was used quite a little as a thinner for sulphur chloride.

TURPENTINE. The distillation of resinous woods may be carried out in as many as five different ways and by means of destructive distillation turpentine, wood-tar and charcoal are obtained. If distilled by means of steam under a pressure of twenty pounds, a very high-grade turpentine is obtained. As far back as 1819 Thomas Hancock in Manchester, England, conducted experiments for the purpose of dissolving rubber in turpentine, but he found that the "solution" dried very slowly because the turpentine contained some high-boiling constituents. Experience has shown that the conversion of rubber and rubber compounds into "cements" is facilitated by first grinding the material in a churn or masticator. In this way the fiber of the rubber is broken down somewhat and the solvent is enabled to act more effectively. It is interesting in this connection to note that it is almost impossible to incorporate such materials as rubber substitutes (sulphurized oils) by merely mixing them in the cement in the churn. The only practical way to add these substitutes to a rubber compound seems to be to grind them into the rubber on the usual mixing mill. In this way the particles are spread through the whole mass uniformly.

In turpentine we have an example of a solvent which has an *almost* constant boiling point, 160 to 170 degrees C. (320 to 338 degrees F.). In other words, it contains no oils which boil at about 100 degrees C., and the result is that the evaporation is not facilitated. This is a problem in vapor tensions which will be recognized by students of physics.

It may be added that turpentine is today of no practical interest for most of the industrial rubber processes, but in those cases where its boiling point is not an objection it will be found to be desirable and effective as a thinner and solvent. Turpentine is interesting to rubber chemists, as it has the same empirical formula as Hevea rubber hydrocarbon ($C_{10}H_{16}$).

PARA-CYMENE. In the manufacture of sulphite spruce pulp certain liquors are obtained which on distillation yield a crude oil. The oil is allowed to stand over lime for about one week and is then subjected to steam distillation. This distilled oil is now washed repeatedly with sulphuric acid until a sample of it when shaken in a small bottle imparts very little color to an equal volume of sulphuric acid. The oil is finally washed with water, dried and purified by distillation. The product so obtained boils at almost exactly 175 degrees C. Its chemical name is 1-methyl-4-isopropyl benzene; its specific gravity at 16 degrees C. is 0.8623, and its flash point, 42 degrees C.

The liquid bears quite a little resemblance to turpentine (boiling point 160 to 170 degrees C.) but it is much more fragrant, and for that reason is used to a considerable extent in perfumes. In 1918 Andrews took out a United States patent covering the use of amino-cymene as an accelerator of vulcanization, but the cymene itself has up to the present been used in the rubber industry chiefly as a solvent for rubber in the laboratory. In order to avoid confusion, it should be repeated that cymene is chemically a derivative of coal-tar benzene (benzol), but is obtained on an industrial scale from sulphite spruce pulp liquors. Its market price today is approximately $2 a gallon, in 110-gallon drums.

DENATURED GRAIN ALCOHOL. To chemists this material is known as ethyl alcohol (C_2H_5OH), to which a small percentage of foreign matter has been added to render it unfit for drinking. It is generally made by fermentation of Indian corn or maize with a small percentage of malt. More recently, however, it has been made by treating sawdust with dilute sulphuric acid. In this way the carbohydrates are changed to fermentable sugars, and the sugars are later fermented by means of distillers' yeast.

A finished alcohol which contains 90 per cent alcohol by volume is known in the trade as "180 proof," and this would show a specific gravity at 16 degrees C. of 0.8340. A United States proof-gallon (of alcohol) is one which consists of 50 per cent absolute alcohol by volume—the other 50 per cent being water. This is known as "100 proof."

With 180 proof alcohol at about 65 cents per gallon, and with 70 degrees Bé. gasoline rising each day from 38 cents per gallon, the question has frequently been raised by rubber factory superintendents as to whether the former liquid could be used as a thinner in admixture with the gasoline. Experiment shows that 100 gallons of 95 per cent denatured alcohol will mix with 30 gallons of a 70-degree gasoline to form a perfectly clear, water-white liquid.

BUTYL ALCOHOL. One corporation has recently put on the market almost pure butyl alcohol. In solvent power this resembles amyl alcohol, or refined fusel oil to some extent. It shows 0.814 specific gravity, and 90 per cent of it boils between 115 and 117 degrees C. (239 to 243 degrees F.). The chemical formula of butyl alcohol is $CH_3.(CH_2)_2.CH_2OH$. It contains no water or acetic acid whatever and can readily be

mixed with an equal volume of gasoline to form a clear liquid, boiling between 115 and 160 degrees C. It may be that a use for this solvent will be found either as a thinner for the varnishes used on rubber-coated fabrics, or as a thinner for the sulphur chloride used in the manufacture of dipped goods. The use of butyl alcohol as a primary material in the manufacture of synthetic rubber from starch was proposed several years ago.

FUSEL OIL. In the manufacture of ethyl alcohol from grain and potatoes, a certain amount of fusel oil is formed. This is a mixture of propyl alcohol, iso-butyl alcohol and amyl alcohol. Its boiling point, therefore, ranges through those of its constituent alcohols, and is higher than that of grain alcohol (79 degrees C.). Fusel oil mixes with an equal volume of gasoline.

ACETONE. The material known to chemists as di-methyl ketone is interesting to rubber goods manufacturers because of its peculiar property of dissolving resins contained in crude rubber. Commercial samples show a boiling point of about 57 degrees C., with about 90 per cent boiling below 58 degrees C. (137 degrees F.). It first came into notice shortly before 1900 when experiments were conducted on deresinating crude dry Pontianak or jelutong. It was found in the laboratory that the resins of rubber could be dissolved in acetone, and this observation was carried over into factory practise. Accordingly, large deresinating plants for the treatment of the jelutong were erected in Akron as well as at Goebilt on the island of Borneo. This process becomes costly when acetone sells at 93 cents per gallon and refined Hevea rubber sells in New York at approximately 20 cents per pound.

One other consideration, however, enters into the question and that is the peculiar properties of the jelutong resin which is thus obtained from crude Pontianak. This resin is probably related to iso-cholesterol and the unsaponifiable matter in wool grease. It melts at about 160 degrees C.

Acetone and grain alcohol are unique among volatile solvents in that they both mix readily with water, and both have a boiling point far below that of water.

In a recent article published by Andrew H. King in *Chemical and Metallurgical Engineering*, mention was made of the fact that the solvent used on an industrial scale for deresinating guayule and Pontianak was composed of 53 gallons of 98 per cent acetone, mixed with 47 gallons of gasoline. The acetone had a specific gravity of 0.8041 at 16 degrees C. (60 degrees F.), while the gasoline showed a specific gravity of 0.7000 and contained practically no residues boiling above 130 degrees C. (266 degrees F.). It was shown that acetone and gasoline, when mixed in the percentages mentioned, will mix without any trouble at all. King has also prepared tables showing the specific gravity of 100 per cent pure acetone to be 0.7946, while 90 per cent acetone (10 per cent water) shows 0.8340 gravity.

The deresination of 1,200 pounds of guayule requires 3,200 gallons of mixed solvent, and the loss of solvent is about 44 gallons of gasoline and 15 gallons of acetone.

NON-INFLAMMABLE SOLVENTS

We now come to the consideration of a group of materials which are of exceptional technical importance because they are, as it were, "fire-resisting." They are, all of them, compounds containing chlorine, and all of them are much heavier than water. Carbon tetrachloride (or tetra-chlor methane), tetrachlor-ethane and tri-chlor-ethylene are the volatile organic liquids to which I have reference.

CARBON TETRACHLORIDE. Since about 1905 more and more attention has been given to the production and use of this material in the processes of the rubber industry. Its agreeable odor quickly made it a favorite over the disagreeable-smelling carbon bisulphide, and the fact that it had a definite boiling point (77 degrees C.) and was not acted on chemically by sulphur chloride, demanded the interest of many in the rubber trade. The price of $1.63 per gallon, however, is prohibitive for its general use as a thinner in cements and doughs. The speed of evaporation is another point which is sometimes left out of consideration in the choice of a solvent. For example, the cement used for painting the inner tube of fire hose should dry in 15 or at most 30 minutes, but this would be impossible if a high-boiling, slow-evaporating solvent were used.

TRI-CHLOR-ETHYLENE. The "chlorine solvents" were introduced over ten years ago, and one of the earliest makers of these products was the Bosnische Electricitaets Actien Gesellschaft in Vienna, Austria. Like tetra-chlor-methane (carbon tetrachloride), this solvent has a fixed boiling point below that of water, and a specific gravity almost one and one-half times that of water. Its current price of approximately $1.83 per gallon, including drums, has interfered somewhat with its wider application, but at the same time it should be recalled that these "non-flam" solvents can be added to gasoline in definite proportions, and the result will be a liquid which will not take fire. The fact that the vapors of carbon tetrachloride will quench the flame of gasoline has been put into practical use in the modern auto fire extinguishers.

TETRACHLOR ETHANE. This solvent has a specific gravity of 1.600, sells at about $2.12 per gallon, boils at 147 degrees C., and like the two previously mentioned chlorine derivatives, it is not ignited by sparks of static electricity. For this reason, our industrial chemists look forward with pleasure to the day when the price of these solvents will make possible a wider use of them. The spreader room fire is a bugaboo, and the fire hazard in the cement churn room is also an item to be reckoned with. Were the "chlorine solvents" now available at 50 or even 75 cents per gallon, it is safe to assume that many of our larger rubber goods factories would rapidly consider their wider use.

LABORATORY TESTS

SPEED OF EVAPORATION. One of the properties of volatile solvents which determines their usefulness to a considerable extent is that known as: *"Speed of Evaporation."* No standard methods for determining this value have been agreed upon but for the practical purposes of the rubber goods manufacturer the following method is satisfactory.

Secure ten of the flat glass dishes technically known as "Petri dishes" used for bacteria cultures. Weigh the dish. Weigh into it ten or even twenty grams of the solvent. Expose the dish to a temperature the same as the temperature which will be used to drive off the solvent, when in actual use. After a certain number of minutes, place the cover on the dish, and weigh the residue. It will be found that an exposure of 30 or of 60 minutes will give interesting results.

In a test such as this it will be found that petroleum gasoline of low and undesirable grade will leave a residue of high boiling oil, and this will interfere with its use as a wiping fluid in cases where the surface of the rubber must be quite clean before a second layer of rubber is applied.

ACTION OF SULPHUR CHLORIDE. In cases where a solvent is to be mixed with sulphur chloride, a preliminary test should be carried out to determine what chemical action, if any, the sulphur chloride will have on the solvent.

IMPROVED BURRS FOR RUBBER HEELS

A new line of rubber heel burrs, so constructed as to be guaranteed perfectly centered, has been added to the products of a manufacturer of high-grade metal specialties. The great difficulty in rubber heel burrs has been that the hole has not been centered and the edges have been ragged, causing them to catch in the mold pins and thereby inconvenience the pressmen and hold up production. This new line of rubber heel burrs is a clean-cut article, perfectly centered, made from high-quality cold rolled steel.—Independent Nail & Packing Co., Bridgewater, Massachusetts.

PAINT AND RUBBER PIGMENTS

THE FOLLOWING covers the salient features of a talk on paint and rubber pigments given by Frank G. Breyer, chief of the Research Division of the New Jersey Zinc Co., at the March meeting of the New York Section of the American Chemical Society.

The technical man who directs the purchases of large consumers of both paint and rubber goods is hampered in his judgments of the quality of both, because each is in that peculiar state of matter which is neither true liquid nor true solid but plastic, and plastics are difficult for both chemist and physicist to deal with.

SPECIFICATIONS

Rubber, and particularly paint, experts among consumers have been trying to pin down the quality of the product they purchase by specifying what ingredients the producer should use and how he should use them.

Some success has been obtained by this procedure but the trouble is that the method is calculated to stifle the initiative of the producer whose success, in a large way, depends on the service he renders by his skill in utilizing in his goods either something that gives better properties than the specified ingredients or that gives the same properties at less cost.

Another trouble with the sort of specification referred to is that it falls short in effect with progressive manufacturers since the latter always occupy an advanced position in knowledge of the technology of the product. The time may be not far distant when the manufacturers will not state the performance of their tires in terms of mileage but instead will say that they will stand a certain number of blows dealt under an accepted standard method and specified tire inflation. Regarding a tire tread it will be said that it will give a "resistance to wear" index-number higher than a certain figure. That the temperature of the tire when worked under conditions approximating summer conditions will not rise above a certain point which rapidly increases hardening, and that when the tire is artificially aged to the equivalent of a year and a half, the rubber will not harden beyond a given point.

Similarly the paint manufacturer will not say that a paint consists of specified ingredients put together in a prescribed way, but that a sample of the paint as sold will respond to certain exact figures for color and hiding power or surface dirt-obliterating power; that test pieces of a paint film when tested in tension will give certain elastic properties when fresh and show a minimum figure for the decrease of elasticity over an artificial aging period. These tests are of exactly the same sort as those under which steel and other metals are specified.

Such as these, in contradistinction to the "ingredient and method of manufacture" specifications, do not reduce everybody in the industry to the same dead level but leave open the way to invention and skill to accomplish the desired result with less labor and with other and cheaper materials, or to make a better product with materials new to the industry.

CHEMICAL AND PHYSICAL METHODS

The study of any material may be made either analytically or synthetically. While each method has its field, experience shows that the latter method yields the more practical results. Physical tests and analysis of paint and rubber should precede if not supersede their chemical analysis. The great value of physical analysis as applied to pigments for use in the paint and rubber industries was brought out in a very clear and striking manner by means of many microphotographs, charts and special methods of test.

The paint and rubber manufacturing industries are fortunate that by the exercise of a liberal policy these new methods for physical analysis and instruments for testing will become generally available for determining pigment values and will eliminate the necessity of waiting the results of aging tests requiring months or years to complete.

PAINT AND RUBBER

A very interesting and close connection exists between paint and rubber and in each material the function of pigments is the same. This connection between paint and rubber is apparent from the following considerations: Each is a suspension of solid particles, five microns[1] or less in diameter, in a plastic medium. Each in its state of usefulness is employed in an altered form—in paint brought about by the effect of driers, and in rubber, by vulcanizing agents. The usefulness of both paint and rubber is measured chiefly by their elastic properties.

Linoleum and oilcloth products were classed as of the paint industry.

IDEAL PIGMENT

The ideal pigment is characterized by (1) the smallest particle size. (2) These do not form aggregates in the disperse medium. (3) They are free from crystallization, (4) exert no injurious but rather a beneficial influence on the mixing. Zinc oxide fulfils all of these requirements and typifies the perfect pigment.

EFFECT OF ULTRA-VIOLET LIGHT

By means of ultra-violet light different pigments which are used both in paint and rubber can be quickly identified without chemical analysis.

The destruction of ordinary paint on the outside of buildings is largely due to the effect of ultra-violet light which is present in sunlight, and to moisture. Some of the hardening and consequent short life of tires and other rubber goods can be attributed to the same agency. The reflection of ultra-violet light by pigments is an important reason for putting them into such goods.

HEATING OF TIRES

The effect of certain pigments, on the heating of tires, especially in summer service, was explained as due to the internal friction generated by the movement of pigment aggregates induced by the elastic movement of the plastic rubber. The probability of this occurring can be diagnosed in a tire by making sections and examining them under the microscope.

Among the many microphotographs of rubber sections exhibited were certain of particular interest such as those showing the even dispersion of zinc oxide in compounded rubber, the tendency of other pigments to form aggregates and the presence of vacuua adjacent to pigment particles in the direction of stretching in rubber under strain as deduced by Schippel in a paper read before the Rubber Section of the American Chemical Society.[2]

PARTICLE SIZE

Screening methods are ineffectual for the determination of particle size. Only that of aggregates can be so measured, even with a 350-mesh opening, since the coarsest pigment particle is five microns, and that of zinc oxide, for example, averages 0.4 micron.

The usual method of counting dispersed particles in the field of a microscope by means of an eye-piece micrometer is not available for measuring the particle size of pigments. A new method has been developed by Dr. Henry Green which permits particles from 0.3 to five microns diameter, magnified 20,000 diameters, to be counted, scaled and tabulated. By this method it has been ascertained that the particle size of zinc oxide is 0.4 micron and that one gram of the substance contains five trillion zinc oxide particles.

[1] A micron equals 1/1000 of a millimeter.

[2] Meeting of the American Chemical Society, Philadelphia, Pa., September 2—6, 1919. THE INDIA RUBBER WORLD, October, 1919, page 20.

Vulcanized Rubber Energy—II[1]

By William B. Wiegand[2]

THE EFFECT OF COMPOUNDING INGREDIENTS

THIS PRESENTS an enormous field of research, and reference will be confined to a brief outline of the basic facts.

Fig. 4 shows hysteresis plotted against the volume percentage of active pigment associated with 100 parts of rubber. The first point on the curve shows a pure gum compound, the second, a lightly loaded breaker compound containing about 4.5 parts by volume of active pigment. The third point represents a very high-grade tread compound containing about 15 volumes of active pigment: the last, another tread stock containing nearly 24 volumes. By active pigment is meant a pigment which definitely increases the energy storage capacity of the compound and includes pigments such as carbon black, lampblack, zinc oxide, the finer clays, etc. It will be noted that for the particular stocks used there is a linear relationship between the amount of hysteresis and the amount of such pigment present. It is also important to note that the effect of the addition of a highly dispersed phase upon hysteresis is much greater than moderate changes in the state of cure of a compound. It is unnecessary to emphasize the importance of this result from the standpoint of practical compounding.

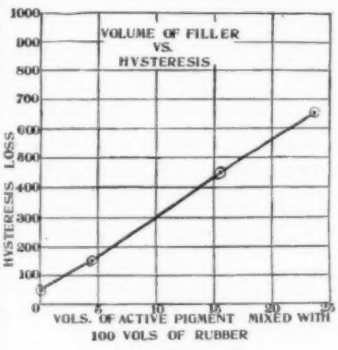


FIG. 4

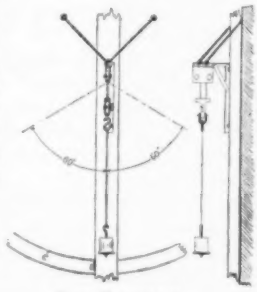
Here again, however, one must use caution not to overlook the importance of heat conductivity, and it is entirely within the realm of possibility that a pigment, although markedly increasing the hysteresis and so also the frictional heat, may at the same time compensate for this by a greatly enhanced heat conductivity. Thus, for example, carbon black not only causes high frictional heats, but is also a bad conductor, whereas zinc oxide, although producing similarly high hysteresis values, has a very much better heat conductance.

It may be of some interest to indicate roughly the actual percentages of energy which are degraded into heat in these various types of rubber compounds. A pure gum friction or skim coat stock when led through a hysteresis loop to an elongation of 200 per cent degrades about four per cent of the total energy into heat. A stock containing about five volumes of zinc oxide degrades about eight per cent, whereas a tread stock containing 20 volumes of zinc oxide degrades in the neighborhood of 14 per cent of the total energy input in each cycle.

FABRIC ENERGY LOSSES

We have dealt thus far with the degradation of energy into frictional losses in and by the rubber substance itself. These are of paramount importance in the case of solid tires, for example. However, in the case of pneumatic tires, which consist primarily of layers of fabric held together and waterproofed by rubber, we have to consider the extent to which frictional heat is developed by the carcass fabric itself. It is true that the hysteresis loss of an inflated casing taken as a whole can be accurately determined by the electric dynamometer. This, however, is an expensive machine, and has the further disadvantage of not being able to determine in what proportion the various constituent parts of the casing contribute to the integral result. The writer has therefore applied the principle of the damped pendulum to the study of casing energy losses. Briefly, the method consists in inserting a one-inch carcass section in the arm of a pendulum which is allowed to swing from a fixed position until it comes to rest. The more perfectly resilient the carcass wall, the longer will such a pendulum swing. In order to analyze the elastic properties of the various structural components of the carcass, it is necessary merely to strip off the tread and breaker and repeat the series of vibrations with the carcass alone. In order to ascertain the effect of the number of plies of fabric the carcass is stripped down ply by ply and the total period of the pendulum redetermined in each case.

Fig. 5 shows the simplicity of the set-up. The inch section is gripped by two clamps, the upper one rigidly fastened to the wall, the lower attached to the pendulum arm, consisting of thick piano wire about 2 feet long, weighted down by a cylindrical bob of convenient mass, say 0.5-pound. Space will not permit description of the minute experimental details, some of which are of considerable importance to the accuracy of the results obtained, but, briefly, the practice was to start the pendulum from a position 60 degrees from the vertical, and take shadow readings on an arc background by means of a fine needle axially inserted in the bob. The "total period" of the pendulum is the number of seconds required for the amplitude to fall from the fixed arbitrary value, viz., when the shadow of the needle reaches the point *C* until the shadow reaches the point *D*, which is preferably a small distance removed from the position of rest. The length of the carcass strip between the clamps may be varied at will, but is preferably about two inches.



TIRE PENDULUM

FIG. 5

SIGNIFICANCE OF TOTAL PERIOD. The total period, viz., the time required for the pendulum to damp down from the position *C* to the position *D* is clearly a measure of the time required for the potential energy of the pendulum system to fall from that corresponding to the height of its center of gravity when the pointer is at *C* to that corresponding to *D*. It is therefore inversely proportional to the rate of generation of frictional heat through the various internal energy losses in the casing section. If the tire were of theoretically perfect resilience the pendulum would keep on swinging forever, except, of course, for external losses due to air resistance, etc.

A typical series of determinations will serve to fix our ideas. A 3.5-inch plain casing gave a total period of six minutes 42 seconds. After removing the band ply of the carcass, the period increased to seven minutes 37 seconds; after removing the second ply, to eight minutes; after removing the third ply, to 10 minutes 55 seconds. When all the carcass plies had been removed and the tread and breaker inserted, the pendulum swung for 21 minutes four seconds. As a matter of fact, it was found in many hundreds of tests that the total period of the pendulum when plotted against the number of plies of fabric in the carcass lay on a smooth curve, shown in Fig. 6.

This curve is of the exponential type, the equation of which is

$$TP = K_1 \times K_2^N,$$

where TP is the total period, K_1 and K_2 are empirical constants,

[1]Continued from THE INDIA RUBBER WORLD, March 1, 1921, pages 425-427. Presented before the Rubber Division at the meeting of the American Chemical Society, Chicago, Illinois, September 6–10, 1920.

[2]Ames Holden McCready, Limited, Montreal, Canada.

and N is the number of plies of fabric. An interesting deduction from this curve is that the frictional losses in a casing are not a linear function of the number of plies of fabric. As a matter of fact, the total period for a 5-ply carcass bears the same ratio to that of a 4-ply carcass, as that of a 4-ply carcass bears to that for a 3-ply carcass. In other words, as the number of plies of fabric is increased the frictional heat increases not in arithmetic but in geometric progression. This constant ratio we have called the "ply factor," and its value in a typical square fabric casing lies very close to 0.7 for ranges of from 2 to 7 plies. If the total period for a 6-ply section is 100 minutes, that for a 7-ply section will be 70 minutes. If there were no fabric friction, this factor would of course become unity, except for the small losses due to the skim coat between the plies.

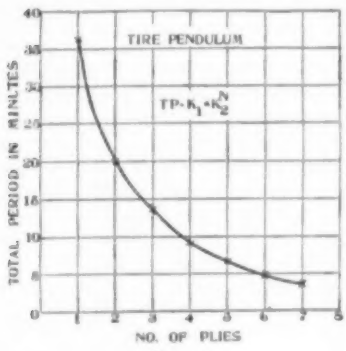


FIG. 6

INFLUENCE OF GUM STOCKS ON CASING ENERGY LOSSES.—It was at first thought that the condition of the skim coat and friction between the plies of fabric might profoundly influence the casing energy losses, and a series of tire sections was therefore prepared of various degrees of under and over-cure. To our great surprise the effect of these exaggerated under and over-cures upon the total period of swing was entirely negligible in every case.

EFFECT OF TREAD AND BREAKER.—Our results, furthermore, showed that, for example, in the case of a 3.5-inch 4-ply casing, the total period of swing for the complete section was almost exactly the same as that for a 4-inch 5-ply casing, stripped of its tread and breaker. We thus see that the entire tread and breaker of a casing contribute no more to the energy losses than does a single ply of carcass fabric.

CORD CONSTRUCTION.—These remarkable results made it at once desirable to ascertain the effect of cord construction, the advantages of which, from the standpoint of internal chafing, seemed obvious. Our experiments fully bore out this idea, and in fact we found that a 5-inch cord carcass swings almost exactly three times as long as a square fabric carcass of the same size. Cord fabric is therefore three times as efficient as a transmitter of energy as square fabric. Our purpose in thus briefly describing the pendulum method of investigation is not to expound the behavior of the various structural elements of a casing, but rather to illustrate the usefulness of a simple, convenient, cheap, and yet accurate physical apparatus in helping to solve the pressing problems of our industry.

EFFECT OF PIGMENTS ON ENERGY STORAGE CAPACITY

Of equal interest is the study of the total energy storage capacity of vulcanized rubber and the profound changes in this quantity which can be induced through the admixture of suitable ingredients. The experimental details of this work have been published elsewhere.[1] The fundamental facts are as follows:

1—A pure gum stock is totally unsuitable for some of the most important technical applications of rubber by reason of its inability to stand abrasive wear.

2—The addition in suitable amounts of certain compounding ingredients enormously improves the wear-resisting power of rubber. Our investigation as to the reasons underlying these facts naturally began with a quantitative study of the effect of the various compounding ingredients upon the mechanical properties of the stock. These properties are very largely expressed by the stress-strain curve, and on selecting a suitable basic mix and adding to it regularly spaced increments by volume of the most important inorganic compounding ingredients, it was at once discovered that profound changes in the character of the stress-strain curve were thereby induced. These changes may be divided into two classes.

One class comprises merely a *foreshortening of the curve.* Thus, for example, the addition to the basic mixing of increasing percentages by volume of barytes produces a stock which, when gradually stressed to the failure point, preserves the same values of elongation and load as in the case of the pure mixing. The only difference is that failure occurs earlier. In other words, this pigment simply dilutes or attenuates the mechanical properties of the mixing. It plays a passive role.

In the other class the stress-strain relationships are profoundly altered. Thus, for example, if glue or zinc oxide or one of the blacks be added to the basic mix in increasing amount, the mechanical properties of the resultant vulcanisate show the following changes:

First, the curvature of the stress-strain curve is diminished and at suitable pigment concentrations actually disappears. That is to say, rubber can be so compounded as to display the same kind of stress-strain relationship as in the case of steel and the other rigid structural materials i. e., Hooke's law obtains. Again, certain of these same pigments, if not added in excessive amounts, produce compounds, the tensile strength of which at rupture remains undiminished or even increased over large compounding ranges. In these cases the final elongation is, however, markedly reduced. In the other cases, although linear stress-strain relationships are induced, both tensile strength and elongation fall off more or less equally.

It has been thought justifiable in view of these striking differences in behavior to call pigments of the second class active pigments and those of the former class inert pigments.

TABLE II

Pigment	Apparent Surface	Displacement of S. S. Curve	Total Energy of Resilience	Volume Increase at 200% El.
Carbon black	1,905,000	42	640	1.46
Lampblack	1,524,000	41	480	1.76
China clay	304,800	38	405	....
Red oxide	152,400	29	355	1.9
Zinc oxide	152,400	25	530	0.8
Glue	152,400	23	344	....
Lithopone	101,600	..	..	....
Whiting	60,390	17	410	4.6
Fossil flour	50,800	14	365	3.5
Barytes	30,480	8	360	13.3
			Base 450	

In Table II are brought together, along with the energy storage capacities which are here designated, the total energy of resilience, the dispersoid characteristics of the pigments in question, and also the increase in total volume of the compounded rubber when stressed to 200 per cent elongation. These volume increases, for the details of which you are referred to a recent paper[2] by my colleague, Mr. Schippel, prove beyond any doubt that particularly in the case of the inert pigments the application of stress causes a partial separation of the pigment from the rubber with resultant development of vacua at the poles. In the active pigments, those which show a positive effect upon the energy storage capacity, this separation from the rubber matrix is very slight. Column 2, which gives the square inch of surface per cubic inch of pigment, indicates that the extraordinary differences in behavior are without doubt attributable to differences in surface energy. When a stock containing one of the active pigments is stressed to rupture, the energy required to do so goes partly towards distorting the rubber phase and partly towards tearing apart the rubber from the pigment particle.

Again, the fact that in the case of the active pigments the rubber remains more nearly adhesive to each particle means more uniform stress on the rubber phase, and so enhanced tensile properties and energy capacity.

Surface energy has, of course, two factors. The capacity factor is represented by the specific surface, and it is the variations in this factor which appear to predominate in the behavior of the various pigments. The other factor, the intensity factor, which is represented by the interfacial surface tension, is also doubtless of importance, as is shown by the fact that zinc oxide

[1] Canadian Chemical Journal, 4 (1920), 160; see also abstract in THE INDIA RUBBER WORLD, 63 (1920), 18. Both references give curves illustrating the effect of various pigments on the energy storage capacity of the rubber.

[2] Canadian Chemical Journal, 12 (1920), 33.

occupies a somewhat anomalous position in the energy column. It is, namely, a more active pigment than would be indicated by its developed surface. Briefly, any pigment of a degree of subdivision corresponding to a surface development of over 150,000 square inches per cubic inch may be expected to belong to the active class. It must of course be remembered that the activity of a pigment depends entirely upon the percentage present in the mixing. Maximum activity is developed for volume percentages lying between 5 and 25. Inert pigments, of course, develop no activity—no matter how much or how little is added.

THE STRUCTURE OF COMPOUNDED RUBBER

In view of the important rôle played by surface energy in the properties of compounded rubber, and also in view of the recently demonstrated fact of the physical separation of the constituent particles from their rubber matrix under conditions of strain, it is clearly of importance that we should know something about the spacial distribution of the component particles of a mixing. Thus, for example, how much barytes may one add to a compound before the particles actually touch each other? How far apart are the particles of zinc oxide in a tread compound containing, say, 20 volumes of this pigment?

These interparticle distances are of theoretical importance, not only for the proper calculation of the forces acting upon the rubber phase occupying the interstices, but also in connection with the influence, if any, of electrostatic charges upon the pigment particles during mixing.

Let us first assume that sufficient pigment has been added to cause actual contact between the particles. Now it is not at all a simple matter to calculate what percentage must be added to bring about this condition. The question involves a study of the theory of piling. Thus, for example, if we fill a quart measure with marbles, the number we can get into the measure depends upon the character of the piling which they assume. If, after laying in the first layer we place succeeding layers in such a way that each marble lies vertically over and touching the one beneath, we obtain what is known as cubical or loose piling. If, however, we shake the marbles down until they lie together as closely as possible, the piling assumes a totally different character, known as normal, close, or tetrahedral piling.

This question of cubical or tetrahedral piling is important in all studies of granular bodies. Thus, for example, the rigidity of mortar under the trowel, and the firmness of the wet sand on the seashore under foot, are both due to the fact that the granules are in a condition of close or normal piling, the disturbance of which by an external force requires an increase in the over-all volume, which in turn is resisted by the vacua which tend to be formed.

If a test tube be loosely filled with sand and subsequently gently tapped, the sand will settle down a considerable distance in the tube. The sand was originally more or less loosely piled. It was certainly not piled in the most loose manner possible, namely, cubically, but occupied some intermediate position. On gently tapping the tube the particles are freed, and, attracted downward by the force of gravity, assume a spacial arrangement more nearly normal or tetrahedral.

THE PILING OF COMPOUNDING INGREDIENTS.—We have now to consider what happens when a pigment is worked into the rubber in a plastic state on our mix mills. Owing to the high viscosity of the gum the force of gravity is not free to act as it did in the case of the sand in the test tube or the marbles in the quart measure. Taking first a case where so much pigment is added that the particles are compelled to touch each other, it is possible to calculate the amount of pigment required on the assumption, first, that the particles are arranged cubically or loosely, and, second, tetrahedrally or closely.

On the former assumption, irrespective of the size of the particles (which are, however, assumed to be uniformly spherical), the amount required would be 52.4 per cent of the total by volume. On the second assumption, the figure comes out at 74.1 per cent.

It is a well-known fact in mill practice that a compound containing 50 per cent by volume of pigment is almost unmanageable on the mill. We therefore deduce that with the customary amount of milling the pigment particles probably exist in a condition more closely approximating the loose or cubical piling than the close or tetrahedral piling. The writer has, however, observed that in working with extremely heavily loaded stocks it is possible, by continued milling, to bring about a more or less sharply defined increase in plasticity with the possibility of working in an additional amount of pigment. With due regard to the breaking down of the rubber owing to this excessive milling, it still remains highly probable that the additional mastication has caused a more even distribution of the rubber phase throughout the mass, which is equivalent to saying that the particles have been rearranged to more nearly normal piling. The writer has in fact succeeded in milling in over 60 per cent by volume of pigment in this way (i. e., 60 volumes pigment to 40 volumes rubber).

SPACIAL ARRANGEMENT WHEN NOT IN CONTACT.—Fig. 7 shows interparticle distances for percentages of pigment ranging all the way from 0 to 80 per cent. The ordinate D shows the distance between the particles referred to their radius as unity. The upper curve shows conditions when the particles are tetrahedrally disposed. Under working conditions in the factory very few compounds contain more than 35 per cent by volume of pigment. Taking, for example, a typical tire tread compound containing 20 per cent of pigment by volume and assuming tetrahedral arrangements, the particles will be distant from each other by a little over their own radius. Assuming cubical arrangement they would be closer together, namely, distant by about three-quarters of their radius. This of course presupposes spherical shape. In actual practice, the pigment particles are by no means spherical, but on the average they are more nearly spherical than of any other definite geometrical shape, and the error due to assuming sphericity will not be large.

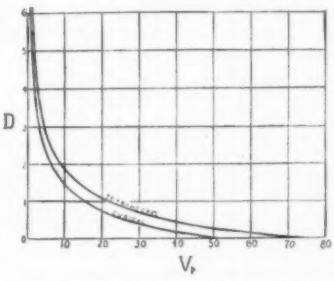


FIG. 7. INTERPARTICLE DISTANCE VS. VOLUME PER CENT PIGMENT

The question as to whether in such cases where the particles are not in actual contact one ought to assume a tetrahedral or a cubical space arrangement is (at least to the writer) very difficult to answer by mathematical analysis. It should be quite possible, however, to reach an approximate solution by numerous direct microscopic measurements on thin sections by transmitted light, and we hope to secure results of this kind in the near future. In any case, the values shown on this chart represent the extremes between which the true values must lie, and we are of the opinion, as intimated above, that the action during milling is that the rubber phase will tend to become as evenly distributed as possible, and that therefore the tetrahedral arrangement is the more nearly in accordance with actual conditions.

The writer fully realizes that the foregoing analysis hardly scratches the surface of the problem of the structure of compounded rubber. Of cardinal importance are, for example, the direct measurement of the surface tension between zinc oxide and rubber, carbon blacks made under different conditions and rubber, and so on. When these values are once determined the capacity factor of the surface energy as measured by the average degree of dispersion of any given pigment can in our opinion be most accurately measured by its admixture under standard conditions in a rubber compound, and the determination of the

decrease or increase in energy storage capacity as compared with other samples of the same pigment. This would seem to be of particular value in the case of the finer pigments, such as the blacks, the individual particles of which are beyond the resolving power of our microscopes.

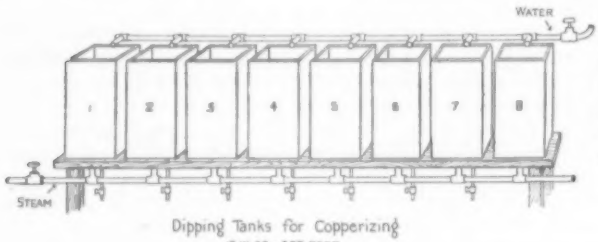
FASTENING IRON AND RUBBER

Scientific methods for copperizing iron are not within reach of all. Many have no knowledge of electro-plating and do not want it. A process used in a factory that turned out 5,000 wringer-rolls a day, but did not use electrical deposition of copper, may be of interest.

The method was termed the Adam process. As a preliminary the wringer shafts were put in a tank, covered with a strong solution of potash and boiled for one hour. The shaft was then rinsed thoroughly in running water, put into a heater and the steam run up to 145 pounds with the exhaust slightly open. This was held for two hours. The shafts thus cleaned of grease were ground rough on a corundum or emery wheel.

For the next step which is copperizing, eight copper tanks, 18 inches square and three feet deep, with a steam coil and water pipe in the bottom of each, were used. The solutions were as follows; first tank, potash water; second, water; third, muriatic acid; fourth, water; fifth, sulphuric acid, 1/3 water; sixth, water; seventh, blue vitriol one pint, water eight gallons, sulphuric acid small quantity. (The blue vitriol is made in earthern jars with the crystals and water and a small quantity of sulphuric acid.) Eighth, hot water.

The shafts are then put in a copper pail perforated with small holes, the dipping beginning with tank No. 1 proceeds as follows: Dip twice in the first; rinse in the second; once slowly in the third; rinse in the fourth; once in the fifth; rinse in the sixth; once in the seventh; then in the eighth, holding until hot enough to dry quickly. The shafts then have a thin coating of copper. When dry, cover with cement. Then wrap a strip of inside stock spirally about the shaft. Build the shaft up with inside stock, cover with better stock for the outside. The roll must fit tight



Dipping Tanks for Copperizing
(8 IN SQ - 3 FT DEEP

when driven into the mold for it takes the pressure to make it bind the shaft and it can be seen how well it does this by the length of the spinout. Small truck wheels and small carriage tires were formerly fastened by the above process.

The Moulton process was as follows: The shaft was steam cleaned and a hole made through each end inside the bearing. A layer of stock was applied to the shaft, then a wire, about one-sixteenth of an inch in diameter more or less, fastened in one end and wound spirally about the shaft and fastened in the opposite hole. The shaft was built up with stock. This, under pressure of the heating, fastened around the wire.

To attach rubber bands for carpet sweeper wheels a weak solution of muriatic acid was put in a tank with steam coils. The rings were put in the solution and heat applied. If the work was done properly this made small cracks on the surface of the ring. The rings were rinsed in running water until the acid was gone. The iron wheel was cleaned and covered with a heavy coat of shellac varnish. Then the band was put on and heated to soften the shellac and when cool the band was fast.

SHOP-MADE AIR BAG FOR GIANT TIRE REPAIR

Unable to wait for air-steam bags to be shipped from the East or the Mid-West, for the repair of giant pneumatic truck tires, a Los Angeles vulcanizer recently began to make his own bags. He claims that he has saved not only time but money, inasmuch as he has produced for $20 a bag that would have cost $40 for a 42 by 9 casing. His method is simple. Having measured with a steel tape the inner circumference of a casing, including the space between the beads as they set on a rim, he gets what he terms a true rim measure. An A-1 red tube of size indicated for the tire is then inflated, cemented and covered with ordinary bias rebuilding fabric until it equals the inner circumference of the casing. Each splice is laid back a short distance to insert the cushion stock, which, it is claimed, holds the fabric better and averts danger of loosening. Much stress is put on careful measuring. A bag made too small might explode, and one too large might buckle. It is not advisable to use the same bag for both straight side and clincher tires, owing to the difference in their contours. By removing the valve core, a solution of 2½ ounces of glycerine to a pint of water is injected into the bag to keep the rubber soft and prevent semi-curing. The air pressure used on repair work would not exceed 70 pounds even on tires that test at 140 pounds. The Los Angeles man is also careful to deflate the bag before removing it from the casing, and preserves its shape and condition by keeping it inflated when not in use. He never cools a bag by throwing it into water, because such chilling would soon crack the rubber lining.


Making a Truck Tire Air Bag

ATHOL TOP MATERIAL FOR AUTOMOBILES

A top material must be immune to the blistering rays of the sun and capable of preserving its strength through all sorts of climatic conditions. Athol top material is a rubber top material recently put upon the market and is composed almost entirely of rubber. It is offered to the trade with confidence in its ability to withstand rough abuse, as it is said to be manufactured after a formula that has stood up under the most exhaustive tests.—Athol Manufacturing Co., Athol, Massachusetts.

"MICHELIN MASTIC"

A new brand of plastic cement, "Michelin Mastic," is now marketed by a well-known tire concern and is said to be most satisfactory when used alone for repairing small punctures and for closing surface cuts in casings. For larger cuts in casings "Michelin Mastic" and cement should be used, and for this purpose these two are put up in a handy combination set containing a 2-ounce bottle of each. This forms a convenient package for the tool kit and may prove a friend in need to the motorist.—Michelin Tire Co., Milltown, New Jersey.

What the Rubber Chemists Are Doing

ACTION OF HEAT AND LICHT ON VULCANIZED RUBBER[1]

AMONG THE DESTRUCTIVE AGENCIES causing deterioration of vulcanized rubber are heat, light, air and oils. Of these, heat and light are probably the most serious and are so frequently spoken of together that many have come to believe that their action is essentially the same, whereas this is not so and the favorite explanations, "oxidation" and "depolymerization," fail as applied alike to the deteriorating action of either heat or light.

The reaction between unvulcanized rubber and sulphur is generally recognized to be a chemical one involving the addition of sulphur at the double bond; therefore the speed of the reaction varies with a change in temperature. The familiar phenomena of "burning on the mill" and hardening or "burning" of compounded rubber during storage, especially when piled up while yet quite warm from milling, illustrate this point. In the presence of certain accelerators, such as the dithiocarbamates, partial vulcanization may occur at room temperatures in 24 to 48 hours. These well-known facts show that it is not necessary to reach the ordinary vulcanizing range, 275 to 300 degrees F., to effect the union of rubber and sulphur.

It is apparent that vulcanization is the chemical addition of sulphur to rubber, the speed of the reaction depending upon the temperature, and the nature of the catalyst present. When only rubber and sulphur are present, the speed of reaction at ordinary temperatures is practically zero, and with a few exceptions this is also true with most accelerators. Vulcanization is therefore a cycle of three steps; (1) zero speed of reaction in the raw stocks; (2) high speed of reaction during vulcanization; (3) a return to zero speed of reaction after vulcanization. To effect proper vulcanization, one must find the temperature at which the quickest cure can be obtained consistent with safe manufacturing practice, and stop the process when the desired point is reached. In curing molded articles, this is done by quick removal from the molds; in such articles as tires, by drenching them with cold water.

After properly vulcanized rubber products have left the manufacturers' hands, there is danger that they may be ruined by exposure to elevated temperatures. As an example, the custom of carrying uncovered spare tires on the rear of automobiles is poor practice, because the heat from the exhaust strikes the lower part of such tires, raising the temperature locally and inducing after-vulcanization.

The principal physical change in vulcanized rubber, when exposed to sunlight, is "cracking" or "checking," which lowers the tensile property. This action is largely dependent on the composition of the mixing. Certain unpublished tests made by the author throw light on this point. About 40 samples of inner tubes were exposed to direct sunlight. Of these, 25 were red and the balance gray. With two or three exceptions, all of the red tubes showed very rapid checking, whereas the gray tubes showed a much higher average degree of resistance. This property is not inherent in the color, for later one of the red tubes which had shown a high resistance to checking was tested against a new sample of gray tube, and the latter showed serious checking after only four to six hours' exposure, whereas the red tube was in good condition after several weeks' exposure. These tests were performed outdoors in winter, and the temperature seldom rose over 50 degrees F., so it may be assumed that the changes were due to sunlight only. If the action of heat and light were the same, the chemical and physical properties would vary alike, differences, if any, being in amount and not in kind.

Heat produces an after-vulcanization, which lowers the tensile properties. Sunlight also reduces the tensile properties, so that we must look farther for differences in their behavior. In studying the chemical deterioration, we may use the method of change in solubility of the rubber substance in such solvents as acetone, alcohol, chloroform, etc. In the study of the effect of heat and light on balloon fabrics[2], there was little increase in the amount of acetone-soluble material after heating in the dark for 28 days at 70 degrees C., although the physical appearance of the samples showed that a marked change had occurred. Some of the fabrics tested were so hard as to crack when bent. The same fabrics, exposed to weathering, showed an increase in acetone extract as the rubber substance decomposed. Some fabrics increased from an initial extract of 2 to 20 degrees, after 15 to 30 days' exposure, and all showed an increase in extract in time. The same phenomena have been observed in other tests on balloon fabrics. As long as the rubber retains its original tensile properties, there is very little change in the acetone extract, but after a certain point, which represents the end of the useful life of the material, a sharp break occurs in the solution curve, marked by a rapid increase in the percentage of acetone extract. The same behavior was noted in the natural aging of rubber and reported to the Rubber Section of the American Chemical Society at its meeting in New York, September, 1916[3]. The samples under observation were rubber bands. A very rapid increase in acetone extract was noted after the bands began to be hard and brittle. These samples were stored in a cool, dark place, at a temperature not exceeding 25 degrees C.

Probably this increase in acetone extract is a true case of oxidation, the reaction being accelerated by sunlight. There is evidence that the speed of this reaction is increased tremendously by the presence of any appreciable quantity of oxidized rubber. It has been noted repeatedly that there is little change in solubility during the early stages of deterioration, but when begun the rate shows a marked increase. This is true irrespective of the time required for the sample to go through the so-called "early stage of deterioration" Rubber bands containing reclaimed rubber showed this break in the curve at a much earlier point than the bands which contained only new rubber.

Another important difference between the action of heat and sunlight is that heat acts throughout the entire mass while sunlight exerts, at first, essentially a surface change, although this rapidly travels to the interior. In the deterioration due to sunlight, the increase in the percentage of acetone extract is influenced by the thickness of the test pieces. Very thin ones such as balloon fabrics show much more rapid increase than thicker test pieces. The difference in the action of heat on thin and thick test pieces is much less marked, showing that the reaction occurs throughout the mass, and such differences as do occur are easily explainable on the basis of the heat conductivity of the rubber.

[1]By John B. Tuttle. Published by courtesy of the American Chemical Society. Read at the meeting of the Rubber Division of the American Chemical Society in Chicago, September, 1920.
[2]Third Annual Report, National Advisory Committee for Aeronautics.
[3]The India Rubber World, December 1, 1916, page 129.

LITHOPONE[1]

The manufacture of lithopone is divided into three steps: The production of a pure barium sulphide solution; the preparation of a pure zinc sulphate solution; the manufacture of lithopone from these two solutions.

BARIUM SULPHIDE SOLUTION

The most important raw material is barytes. This is now obtained chiefly from Georgia, because the ore deposits there

[1]Paper read by Donald Ross, chief chemist Krebs Pigment & Chemical Co., before the Delaware Section of the American Chemical Society.

can be worked satisfactorily with steam shovel, whereas most Tennessee and practically all Missouri deposits are so small that they are mined by pick and shovel.

Barytes as received at the factory is crushed, mixed with coal and burned at 1,200 to 1,300 degrees C. from two to three hours in rotary kilns. The black ash formed is leached, giving a solution of barium sulphide.

ZINC SULPHATE SOLUTION

In the manufacture of zinc sulphate any form of zinc or zinc oxide such as skimmings, zinc ash from galvanizing kettles, impure oxides or zinc carbonate ores may be dissolved in sulphuric acid. Zinc sulphide or roasted zincblende may also be used. The resulting solution is purified by various oxidizing processes, depending on the nature of the liquor.

LITHOPONE

By mixing proper proportions of the zinc and barium liquors, lithopone is precipitated. Plate and frame presses or continuous filters are used in filtering the pigment and the cake is dried and heated in muffle furnaces to about 500 degrees C. When uniformly heated the material is raked out, quenched in water and ground to remove grit due to sand from the furnace walls or to the sintering of overheated particles of lithopone. The ground pulp is washed, filtered, dried, pulverized, sometimes air floated, and packed in barrels of 400 pounds or bags of 50 pounds.

USES OF LITHOPONE

Lithopone is surpassed in whiteness only by the finer grades of zinc oxide. Large quantities of lithopone are used in the manufacture of paint, rubber goods, linoleum, wall paper, window shades and printing inks. The lithopone industry has grown from 920 tons in 1900 to a production of 79,619 tons in 1919, and it is expected that the 100,000-ton mark will be reached in 1920 or 1921.

THE ABSORPTION OF LIGHT BY CAOUTCHOUC[1]

By S. Judd Lewis and B. D. Porritt[2]

In view of the changes which are produced in rubber when exposed to light and air, it is somewhat surprising that no record appears to exist of any effort having been made to study the action of light on caoutchouc in a quantitative manner. It was therefore decided to carry out some preliminary experiments to determine the character of the absorption of light of short-wave length by caoutchouc, to which experience has shown that the successive physical and chemical changes which occur during "perishing" must be attributed.

With this object a specially good sample of fine hard Pará rubber was selected in the crude condition before subjection to any manufacturing operation. This was cut into fine strips and submitted to repeated extraction with cold distilled water for a period of over a week, followed by extraction with cold acetone until the washings were no longer colored. A final prolonged digestion with several changes of absolute alcohol was employed to ensure the complete removal of resins and soluble coloring matters, and the extracted rubber was thereafter dried at ordinary temperature in a current of hydrogen to prevent oxidation. The dry material was then transferred to a stoppered separating funnel in which it was allowed to swell and slowly dissolve in anhydrous ethyl ether (purified by treatment with sodium and fractional distillation) without agitation. The clear caoutchouc solution was withdrawn at intervals before it became unduly viscous, from the bottom tap, the passage of proteid and insoluble matter being prevented by the insertion of a small plug of asbestos fiber, and the volume removed was replaced by the addition of fresh solvent.

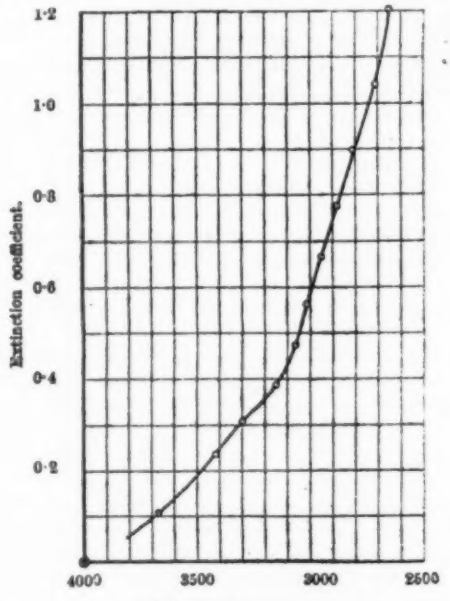
In this way a sufficient quantity of a perfectly transparent, colorless solution of caoutchouc was obtained containing approximately 0.94 per cent of solute by weight. As it was found that this solution gave only very feeble absorption, it was reduced by spontaneous evaporation to about two-thirds of its original volume, thus increasing its strength to approximately 1.5 per cent.

The method of procedure followed was similar to that described elsewhere with the exception of the photometer employed, which was of the new sector type, the details of which have lately been published[4].

The 2-cm. cell containing the solution was placed in one path of light, and a duplicate cell filled with the purified ether, similar to that used for the preparation of the solution, was placed in the other beam for the purpose of providing a control. The absorption effect was therefore confined to the solute alone, that of the solvent being eliminated. The ether employed was found to give no absorption at wave lengths above 2170 sufficient to interfere with the experiment.

The results obtained are exhibited in the accompanying curve, in which are plotted the values of the extinction coefficient, that is of log I/I′, relative to a three per cent solution in a cell of unit thickness as ordinates against wave lengths as abscissæ (I is the intensity of the incidental light, and I′ is that of the light transmitted). The curve has not been smoothed out, as the slight irregularities may prove to be significant.

In considering these preliminary results it is in the first place remarkable that caoutchouc should be so transparent to light as to call for the use of so concentrated a solution as 1.5 per cent in a 2-cm. observation tube.



Ultra-Violet Absorption Spectrum Curve of Ethereal Solution of Caoutchouc Calculated on a 3 Per Cent Solution in a One-Cm. Cell

The curve exhibits only a general absorption which is fairly strong for wave-lengths below 2700, but rapidly diminishes with increase in wave-length.

Neither with the strong solution nor with weaker ones has there been any decisive evidence of absorption bands, but the investigation has not gone far enough to say whether caoutchouc is capable of exhibiting these or not.

Further work is in progress on different types of rubber and allied compounds with a view to confirming these preliminary observations, and if possible securing some evidence regarding the constitution of caoutchouc.

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[1] Journal of the Society of Chemical Industry, January 31, 1921.
[2] Rubber Research Association, University College, London.
[3] Proceedings of the Royal Society, Bristol, 89, 329.
[4] Chemical Society Transactions, 1919, 115, 312.

CHEMICAL PATENTS

THE UNITED STATES

TIRE FILLER. COMPRISING A MIXTURE FORMED OF THE FOLLOWING ingredients: Crude rubber, a compounding ingredient or filler, a vulcanizing ingredient, an accelerator, a leavener and a vehicle—the mixture having minute air pockets distributed throughout, thereby providing the mixture with a rebounding quality.—Vincent Cuttitta, New York, New York. United States patent No. 1,369,626.

THE DOMINION OF CANADA

RUBBER COMPOUND CONSISTING OF CRUDE RUBBER, GRANULATED iron slag and cork flour, the quantity of rubber in the compound by weight being less than the combined weights of the iron slag and cork flour.—Eugene Von Vergyas, Washington, British Columbia, Canada. Canadian patent No. 208,194.

SIZING FIBROUS MATERIALS, PROCESS AND PRODUCT. THE process of treating fibrous material which comprises applying thereto a lubricant including castor oil and beeswax and treating the material thus prepared with a coating of rubber. The manufactured article having the individual fibers coated with waxy lubricant while maintaining the spaces normally present between the fibers substantially open and a layer of rubber intimately associated with the fibrous material, the proportion of lubricant being relatively small to obviate deleteriously affecting the bond between fiber and rubber.—The Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, Canada, assignee of Alfred E. Jury, Newark, New Jersey, U. S. A. Canadian patent No. 208,397.

PROCESS OF COMPOUNDING RUBBER CONSISTING OF INCORPORATING glue containing 7 to 13 per cent of water and implasticized rubber to a mixing or milling action at a temperature sufficient to plasticize the glue and substantially dry the mixture.—The Goodyear Tire & Rubber Co., assignee of William G. O'Brien, both of Akron, Ohio, U. S. A. Canadian patent No. 208,406.

PROCESS OF RECLAIMING WASTE RUBBER COMPRISING DISINTEGRATing it, subjecting the disintegrated mass to the action of a heated liquid bath containing approximately 10 to 15 per cent by weight of caustic soda in aqueous solution for approximately from six to 20 hours at a pressure of from 50 to 200 pounds per square inch. Then subjecting the treated waste to the action of a solvent comprising approximately one part by weight of phenylene diamine, two parts by weight of paraffine oil, two parts by weight of mineral rubber, one part by weight of rubber resin, two parts by weight of acetic acid, and washing and drying the resulting mass.—Frank L. Kryder, Akron, Ohio, U. S. A. Canadian patent No. 208,506.

THE UNITED KINGDOM

INDIA RUBBER COMPOSITION CONTAINING CHINA OR OTHER CLAY which has been treated with water and a deflocculating agent such as sodium carbonate or ammonia, and which has been dried while in a deflocculated state. In an example, 160 parts of the treated and dried clay are mixed with 228 parts of rubber and 12 parts of sulphur.—P. Schidrowitz, 57 Chancery Lane, and W. Feldenheimer and W. W. Plowman, 20 Holborn Viaduct, both in London. British patent No. 153,343.

DEVULCANIZING RUBBER. VULCANIZED RUBBER IS DEVULCANIZED by simultaneous treatment with a benzene hydrocarbon, such as ten per cent of xylol or one of its homologs and a carbocyclic amido compound such as 2½ per cent of aniline or one of its homologs in the presence of a substance capable of absorbing or combining with sulphur, such as a hydrate of an alkali metal. The treatment is conducted in a digester in which the temperature corresponds with a steam pressure of 60 to 150 pounds per square inch.—J. Young and W. W. Benner, Akron, Ohio, U. S. A., British patent No. 153,646.

VULCANIZING INDIA RUBBER. AN ARYL SUBSTITUTED THIOUREA containing one or more alkyl groups, one of which is in ortho position to the nitrogen of the thiourea, is used as an accelerator in the vulcanization of rubber. The accelerator is the product of the reaction of carbon bisulphide on an ortho-alkyl substituted aromatic amine, namely, orthotoluidine. In an example, a mixture of 50 parts of rubber, 45.5 parts of zinc oxide, 3.5 parts of sulphur, and one part of di-ortho-toluyl-thio-urea is vulcanized by steam at a pressure of 40 pounds in ten minutes.—The Goodyear Tire & Rubber Co., Akron, Ohio, U. S. A., British patent No. 153,890.

RUBBER SUBSTITUTE IS MADE BY MIXING A CELLULOSE DERIVAtive, with or without a solvent, with a larger quantity of a gelatinizing medium than is necessary for gelatinizing the cellulose derivative, adding large quantities of organic or inorganic filling materials, heating to drive off water, and molding under heat and pressure. In an example, 400 grams of nitrocellulose are mixed for half an hour with 260 grams of water, and 1200 grams of barytes; 300 grams of a gelatinizing medium such as ethyl-acetanilide is added and kneaded for an hour, when the temperature is raised to evaporate the water. The mass is molded under pressure at about 130 degrees C., and on cooling is ready for use.—P. Balke, and G. Leysieffer, Troisdorf, near Cologne, Germany. British patent No. 154,157.

OTHER CHEMICAL PATENTS

GERMANY

PATENTS ISSUED WITH DATE OF ISSUE

333,496 (August 22, 1918.) Method for making rubber-like products. Badische Anilinund Sodafabrik, Ludwigshafen on Rhine.

332,974 (February 21, 1919.) Process for drying crude rubber with the help of indifferent gases. Aktiengesellschaft Metzeler & Co., Munich.

LABORATORY APPARATUS

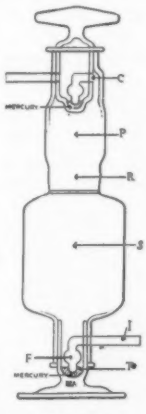
LABORATORY STOVE

A NEW, simple and efficient electric stove for laboratory use is shown in the accompanying illustration. It is of durable construction of sheet metal, with cord and plug ready for attachment to any convenient lamp socket. It can be used for direct or alternating current of 110 volts.—The Will Corporation, Rochester, New York.

ELECTRIC STOVE

MERCURY SEALED ABSORPTION TUBE

One of the most popular absorption bulbs for CO_2 determinations is the new Fleming mercury-sealed bulb shown in the illustration, which shows plainly the method of filling. Place just enough mercury in lower trap *T* to seal. Wet a small piece of cotton and lay around *F* to keep asbestos out of mercury. Over this place small amount of asbestos. Fill *S* with 20-mesh soda lime, well screened from dust, preferably 2 per cent moisture soda lime is used, and after filling run air through warm water and into *I* until absorbent increases about 10 per cent in weight. Plug *I* loosely with cotton. Pack *R* with asbestos and fill *P* with phophorus pentoxide. Tube *C* of hollow top stopper is packed as follows: A little pledget of cotton is first inserted into this tube, followed with a little asbestos.—Eimer & Amend, 211 Third avenue, New York.

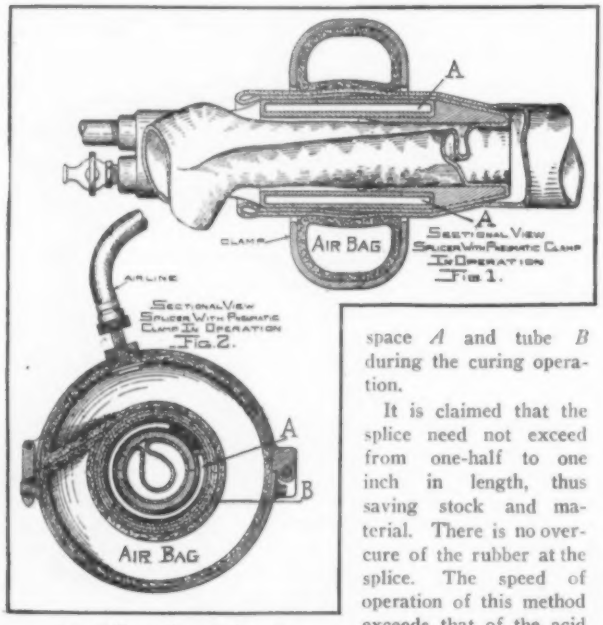


FLEMING ABSORPTION TUBE

New Machines and Appliances

PNEUMATIC TUBE STEAM SPLICER

It is estimated that 95 per cent of inner tubes are spliced by the well-known cold cure or acid method. This is due to the fact that steam cure methods generally are not economical in labor cost, although more reliable in effect and eliminate all of the serious objections incident to the cold-cure method. A successful pneumatic steam tube splicer recently perfected is shown in the illustrations. Fig. 1 is a sectional view showing method of holding the inner tube and clamping the joint for steam cure. The clamp contains an inflatable air bag for exerting pressure on the joint under cure by the circulation of steam in the annular space *A*. Fig. 2 is a cross-section through the clamp and tube, showing the arrangement of the air bag, steam space *A* and tube *B* during the curing operation.



INNER TUBE STEAM SPLICER.

It is claimed that the splice need not exceed from one-half to one inch in length, thus saving stock and material. There is no overcure of the rubber at the splice. The speed of operation of this method exceeds that of the acid cure. An important saving is effected in the matter of wrappers and by the elimination of acid fumes safe working conditions are secured as regards the health of the employes.—The Pneumatic Tube Steam Splicer Co., Baltimore, Maryland.

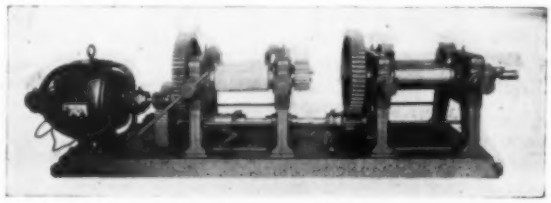
THE YARWAY SEATLESS BLOW-OFF VALVE

Very ingenious is the celluloid sliding model of the Yarway seatless blow-off valve, made by the Yarnall-Waring Co., Chestnut Hill, Philadelphia, Pennsylvania. The valve is of the seatless hollow piston type, without any projection upon which scale or sediment can accumulate. The pressure is against the side of the piston when the valve is closed, and means are provided for setting up the packing when the valve is under pressure. There is also visual indication of the location of the plunger in the body at all times. The packing is automatically compressed when closing the valve, and remains stationary, being protected from the blast of the blow down.

EXPERIMENTAL RUBBER MACHINERY

A very useful combination of rubber-making machinery designed for laboratory and experimental purposes is herewith shown. It consists of a corrugated roll wash mill and a mixing mill.

The mills and motor drive are mounted on a single continuous bed-plate for greater rigidity. The gears are all machine cut and either machine is operated by independent clutch connections.—The Banner Machine Co., Columbiana, Ohio.



LABORATORY MILLS

MACHINE FOR WRAPPING COILS OF WIRE

Small or medium sized coils of either insulated or bare wire are quickly wrapped with this machine. The open-gap type shuttle carries sufficient paper to wrap from 12 to 20 coils, depending on their size. The paper plays out at one end through a tension device and an edge folder applies it with the edge turned under. At the same time a strip of gummed tape is also applied. This strengthens the wrapping and prevents the layers from slipping.

PIERCE WIRE WRAPPING MACHINE

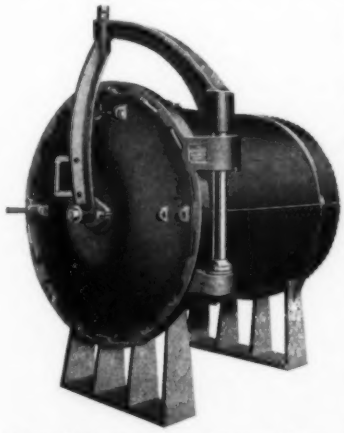
A set of gear chains is provided which permits the wrappings to be done with an advance of ⅞, 1, and 1⅛-inches per revolution of the shuttle, the speed of which is 300 r. p. m. The device handles coils with an inside diameter of from 5 to 20 inches, and cross-sections of from 2 to 5 inches. It is stated that the actual wrapping time of a coil of average size is 10 seconds and that a regular output of 125 coils an hour may be attained.

The machine is provided with a motor, and a conveniently located lever controls both the clutch and the brake. A novel way of overcoming the difficulty of getting the various sized coils exactly in the center of the shuttle in order to apply the paper evenly, is through the use of the slanting runway at the left of the machine. The correct position for the different sized coils is secured by raising or lowering the bar, which in turn raises or

lowers the necessary mechanism.—Pierce Wrapping Machine Co., Chicago, Illinois.

A QUICK CLOSING VULCANIZER HEAD

A vulcanizer door of simple design that is self-sealing, and moves on roller bearings is shown in the accompanying illustration. The head is made of high grade cast steel with all bearings either roller or ball. The design makes balance perfect and permits the door to be easily opened by one man, swinging in half the space usually required. It is perfectly universal in movement, and can be opened without binding, swinging to and fro with utmost freedom. The door is built complete with vulcanizer shell in all standard sizes up to 96-inch diameter, for any desired pressure and any length. It is easily adapted to installations by use of a special shell ring.—The Adamson Machine Co., Akron, Ohio.



The Adamson Self-Sealing Door

WOOD APRON CONVEYORS

A most effective installation is that shown in the illustration which is typical of how leading rubber and other industrial plants are keeping on the move such materials as coal, ashes, raw materials and outgoing products.

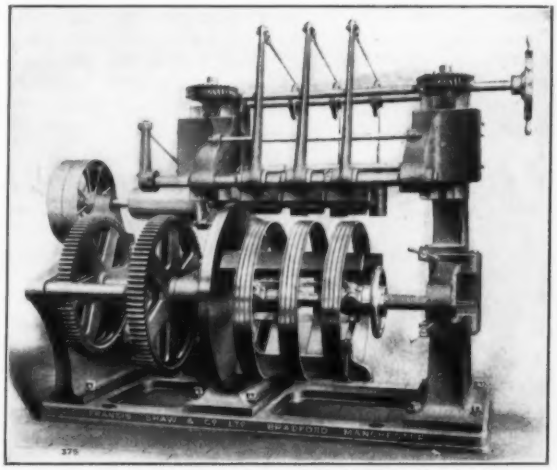
Conveying Coal and Ashes in an Akron Rubber Mill

For handling coal and ashes the equipment consists of a track hopper, plate feeder, single roll crusher, and bucket conveyer. For handling material such as cases of crude rubber and other materials, an apron conveyer is furnished.—The Jeffrey Manufacturing Co., Columbus, Ohio.

A BRITISH MACHINE FOR BUILDING SOLID TIRES

This machine for building solid tires direct from the calender consists of a sturdy frame on which is mounted independent gearing for driving a face plate with adjustable arms, arranged to take all standard sizes of truck tire rims. The arms are expanded and contracted by a hand-wheel and screw, thus affording means for placing and removing the rims.

The machine is placed in front of a three-roll calender, having rollers approximately 27 inches long by 12 inches diameter, provided with cutting knives, to supply three widths of rubber sheet, which are built up on the rims. The driving mechanism is so arranged that the periphery speed of the tire, as it becomes larger in diameter, is regulated to suit the speed of the calender. Pressure is applied on the rims during the building up operations by means of rollers suspended on wheels, provided with balance weights.—Francis Shaw & Co., Limited, Bradford, Manchester, England.



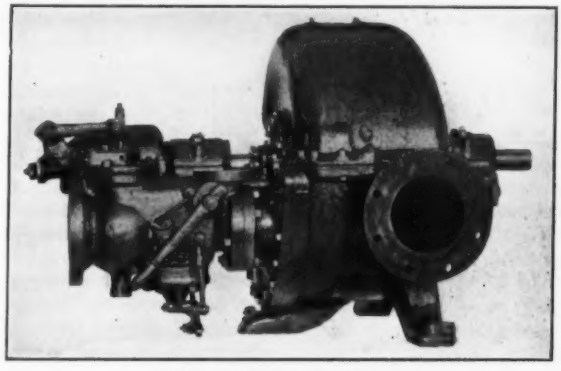
The Shaw Solid Tire Builder.

STEAM TURBINE FOR PUMPS AND BLOWERS

A new turbine of the Curtis type suitable for driving centrifugal pumps, blowers, etc., has recently been developed. The turbines are of one, two, or three stages, and operate at steam pressures of from 50 to 300 pounds, with or without superheat, and either condensing or non-condensing.

The turbine is constructed throughout to give the greatest strength and rigidity possible, and the casing is divided horizontally in halves, the upper of which can be easily raised for inspection or removal of the wheels. The steam connections are arranged so that they need not be disturbed when it is desirable to remove the top of the casing.

The turbine is equipped with speed control in the form of a centrifugal governor, and if desired an emergency governor. The first is of the centrifugal tension spring type, the motion of the weights being transmitted through ball-bearing connections to the governor valve. The speed may be adjusted while the turbine is running by a simple operation of the governor valve. The emergency governor, if attached, operates entirely independently of the



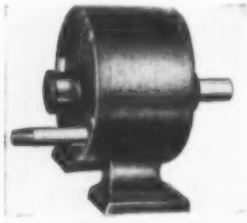
Curtis Steam Turbine

main governor, when the speed rises to about 15 per cent above normal.

The steam passes through the first stage nozzles, from the steam chest, the nozzles being opened, or closed, as required by hand valves placed in the steam chest. The governors control the flow of steam to all nozzles.—The General Electric Co., Schenectady, New York.

TOY BALLOON INFLATING DEVICE

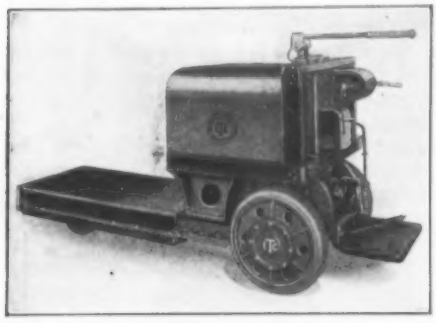
One of the simplest devices for inflating toy balloons is a small rotary air compressor, connected direct to a small motor, arranged for either alternate or direct current. The motor armature and parts of the compressor shown herewith are fully protected by the steel casement in which they are enclosed. The compressing element of the compressor is also enveloped by a cast steel body, and is complete with a steel shaft. Both are supplied with a heavy base, and finished in black enamel. The pressure of air varies with the speed at which the compressor is driven. The volume of air depends upon the type of the machines, which are made in three sizes, all of which can be made to drive from 500 to 1600 r.p.m. The minimum pressure of the smallest size is three pounds, while the maximum pressure of the largest is thirty-two pounds. The pressure to be used is naturally determined by the quantity of balloons to be inflated daily and the quickness with which the operator works.—Anderson Electric & Equipment Co., 154-160 Whiting street, Chicago.



ROTARY COMPRESSOR WITHOUT MOTOR

SELF-LOADING ELECTRIC TRUCK

The principal feature of this all-steel electric truck with a capacity of five thousand pounds, which commends it to rubber manufacturers, is the fact that it is self-loading and offers many possibilities for saving both time and labor in handling crude rubber and other materials in bulk, or carrying cores and molds about the plant.



THE COWAN INDUSTRIAL TRUCK

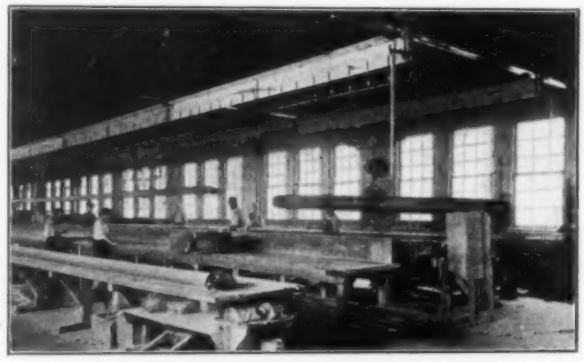
As shown in the illustration, the loading platform is in front of the truck and runs on small wheels. The lifting mechanism is operated by an independent, heavy-duty, series-wound motor and worm-gear reduction. The platform lifts vertically, the rise being 4½ inches. It can be stopped at any point in the rise or descent by the operator, who stands on the platform at the back of the truck and controls the lifting mechanism with a foot-pedal. It is stated that three seconds are sufficient for full lowering, and five or six for elevation, depending upon the size and number of batteries used. The back of the truck is fitted with a heavy bumper which takes all shocks and protects the rear end of the lift platform. A drawbar attachment enables the truck to haul a trailer and act as a light-duty tractor.

Automatic brake and circuit breaker, four-wheel steer, and single reduction worm-drive of the power axle are the main features of the operating mechanism. The wheels are of heavy steel with solid rubber tires. The length with platform is 102 inches overall, the width is 36 inches overall, and the height is 51 inches over steering shaft head. By folding the foot-pedal and steering handle into a vertical position, the overall length is shortened to 91½ inches for use on elevators. The batteries are either alkaline or lead, and the controller is of the drum type, with three speeds forward and three speeds reverse.

This truck can be used in intersecting aisles 5 feet wide, and the extreme outside point of the turning radius is 7 feet, 10 inches. —Cowan Truck Co., Holyoke, Massachusetts.

OVERHEAD CARRYING SYSTEM

An overhead carrying system is a great time saver in production expense whether a rubber plant be large or small. The illustration shows a system of this sort that is different from the ordinary. It meets every condition and requirement and takes the place of the usually heavy, cumbersome and costly *I* beam and travelling crane and displaces barrows, trucking and other slow, laborious, time-wasting contrivances. Its system of tracks, turntables, switches and carriers will go anywhere, curving in and out



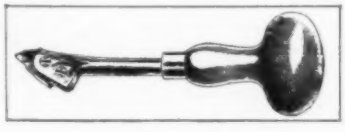
HOSE POLE CONVEYOR

of doors, over and around machinery, or from floor to floor, placing the loads exactly where wanted.

The illustration shows the overhead system used for conveying hose poles in a rubber hose making room.—The Louden Machinery Co., Fairfield, Iowa.

FABRIC KNIFE FOR TIRE REPAIR

A very convenient and effective tire repair tool, known as the H. F. safety canvas knife, is shown in the illustration. It holds two adjustable blades which can be set for cutting through fabric without harm to the underlying plies in the operation of stepping down stock for rebuilding or repairing the canvas. The handle of this tool is of ball form, fitting the palm of the hand conveniently for pushing the cutting edges through the rubberized fabric.—Harvey Frost & Co., Limited, London, England.



SAFETY FABRIC KNIFE

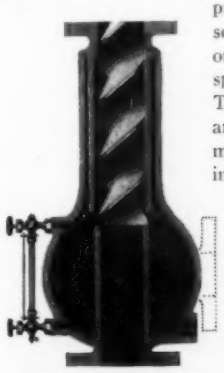
CUTTING PURE RUBBER SHEET

Pure rubber sheet for making dress shields, bathing caps and similar goods is calendered very thin, and is correspondingly difficult to cut into bands or strips with sharp edges without special machinery. However, when dusted and snugly rerolled on a heavy paper tube, it may be neatly cut in a lathe with a hand knife, provided the precaution is observed to cool the rubber to freezing or below. Under this condition the strip gum will have smooth, un-

attached edges, whereas at ordinary room temperatures the rubber would cut with rough edges fused together.

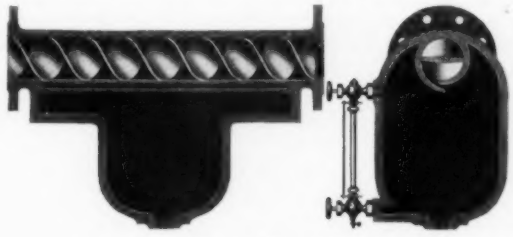
DEVICE FOR SEPARATING MOISTURE FROM STEAM, GAS AND COMPRESSED AIR

Many rubber manufacturers have found this type of separator gives excellent service in eliminating the moisture from compressed air at the point of usage. The separators are installed at proper points on the pipe lines and take up no more space than the pipe itself and its flanges. The horizontal, vertical, and angle types are shown herewith. The separators are made of steel plate and built for a working pressure of 200 pounds unless otherwise specified. Companion flanges and gage glasses are also furnished.



VERTICAL AND ANGLE SEPARATOR

The steam or compressed air, when passing through the separator, is caused to revolve around the spiral many times. Any foreign matter that is heavier than the steam is thrown outward by centrifugal force, where it is acted on over and over again. The denser portion is repeatedly shaved off by the overlapping edge of the slotted opening shown in the cross-section. The water or other matter thus separated is delivered into the collecting chamber below, where it is entirely isolated and cannot



HORIZONTAL SEPARATOR

be picked up again and carried along by the currents of steam. The steam passes through easily without obstruction and without loss of pressure.—United Machine & Manufacturing Co., Canton, Ohio.

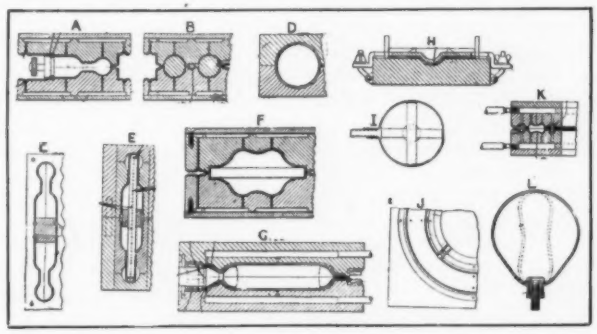
MACHINERY PATENTS

VACUUM PROCESS OF MOLDING HOLLOW RUBBER GOODS

IN THE MANUFACTURE of hollow rubber articles, like nipples, syringe bulbs, hot water bottles, football bladders, inner tubes for pneumatic tires and so forth, the rubber sheets are seated by vacuum in two sets of mold dies or cavities. The sheets are brought together to form a peripheral seam which encloses an interposed mandrel or permanent hollow stem. At the same time the sheet is cut to the desired shape by knife edges extending around the mold cavities.

Figs. *A* and *B* apply to nursing nipples. A rubber sheet is seated on each mold plate and is drawn into the mold cavities by vacuum. The clamping grooves and the cavities are both in connection with the chambers to which vacuum is applied. A set of mandrels carried by a bar is then placed in position and the mold plates are forced together. Knife edges running around the interior of the mold and extending to meet the mandrels, sever the sheets and force together the severed edges, at the same time pressing the rubber into the grooves provided to form the beaded edge of the nipple. The mandrel carrying the partially formed nipples is then removed to the vulcanizing chamber.

Another method, slightly different in application is shown by Fig. *C*. Here the nipples are formed end to end and the connecting part of the mandrel is slightly enlarged in order to force the rubber into the bead grooves and at the same time to make the waste portion relatively thin. In vulcanizing this form, the seam produced by molding, is placed out of the plane of the vulcanizing mold plates, see Fig. *D*. Still another manner of making the double nipple is illustrated by Fig. *E*. A cylindrical mandrel with a central collar is employed and the vulcanizing mold cavities are formed perpendicularly to the faces of the mold plates, thus avoiding any external seam and obviating the need for the waste piece. The nipple end is expanded for vulcanization by



VARIOUS MOLDS FOR HOLLOW RUBBER GOODS

water, etc., enclosed prior to molding, the pressure being transmitted by passages indicated by the dotted lines shown in the illustration *E*.

Fig. *F* relates to syringe bulbs. The mandrel is entirely enclosed. After vulcanization, it is removed by cutting off the ends of the necks. The humps prevent undue stretching of the rubber when drawn into the cavity. Fig. *G* pertains to hot water bottles. In addition to the main mold cavity there is a half-conical cavity to take the funnel mandrel, which carries the usual internally threaded ferrule. It is formed with a bevel to act in unison with a semi-circular extension of the knife edge running around the cavity. The rubber sheet is secured over the mold plate prior to being drawn into the cavity by a clamping ring (Figs. *G* and *H*) formed with an extension surrounding the funnel. A similar process and apparatus is used for football bladders, etc. A hollow rubber stem, in this case, is vulcanized into the bladder. Both this and the preceding example illustrate the ready applicability of reinforcements such as strips shown in Fig. *I*, or the tab and neck pieces in Fig. *G*. These are placed in position after the sheet is seated and prior to the closure of the mold. Similarly the necks of the syringe bulb may be reinforced by a small section of rubber tube carried at each end of the mandrel.

For inner tubes, Figs. *J* and *K*, the molds have inner and outer clamping grooves, inner and outer cutting edges extending radially inwards to sever the portions of sheeting for enclosing the valve stem. Each mold cavity and likewise the vulcanizing mold, is formed with a hump giving the tube a cross-section as indicated in Figs. *K* and *L*. On the expansion of the tire cover, the inner and the outer peripheries are somewhat thicker than the side walls and in addition, insertion is facilitated. Before closing the valve stem Fig. *J*, reinforcing washers and rings are laid in the groove between the cutting edges. During the vulcanization, where necessary the articles are kept extended in the mold by pressure supplied through the hollow stem, similar to the valve stem in the case of the inner tube, or by water, ammonia, and other liquids introduced before closing the mold.—Fred T. Roberts, Cleveland, Ohio, U. S. A., July 8, 1919; British Patent No. 17085.

APPARATUS FOR WEAVING MULTIPLY TUBULAR FABRICS

This invention relates to a process of producing multiply tubular fabrics such as gas tubing or fire engine hose, without the necessity of drawing one tube within another. The loom weaves one ply of fabric directly upon another in such a manner that the intersections of the inner ply are filled by the threads of the outer ply, producing a locked effect which increases the non-leakable properties.

The apparatus consists of a multiplex circular loom with a central weaving pin having a number of weaving surfaces along its length, superimposed shuttleways with supports, a set of shuttles arranged to travel in each raceway, a set of heddles for each shuttle, warp and weft thread-tensioning devices, means for operating both, and an arrangement for drawing the woven fabric from the weaving pin and from one weaving surface to another. The operating mechanism for each set of devices weaves a circular ply of fabric in one direction while the other set weaves a circular ply in the opposite direction, but directly upon the ply woven by the first device. In other words, the shuttles at one elevation operate in a direction opposite to that of the shuttles of another elevation. The heddles work in unison with the particular shuttle for which they make the shed.

As the bobbin unwinds, the tension is maintained in proportional relation to the diameter of the bobbin and the peripheral winding speed. The weft thread in unwinding travels from one end of the bobbin to the other, thus centralizing it and equalizing the lengthening and shortening of the thread from different points of the bobbin to the spindle. The thread passes over the spindle to the conical grooved tension wheels, where it passes back and forth until the right tension is attained. The warp threads coming from their respective spools are tensioned by passing through guide bushings over and under removable rods having a surface of leather or other friction material.

The finished multiply fabric is pulled from the weaving pin, after the last ply has been woven, by the take-off mechanism which consists of two adjustable pressure rollers furnished with gripping-pin bars. The pins are of sufficient length to penetrate the outer ply of fabric and to engage the inner ply, maintaining an even tension on both plies as the fabric is pulled from the weaving pin. The tendency to tear the fabric or the crowding of the fabric between the pins is fully overcome. The weaving pin has two weaving surfaces with the connection portion reduced in diameter. The reduced portion serves to guide the fabric from the lower weaving surface to the upper.—Maglois P. DuPray, Trenton, New Jersey. United States patent No. 1,357,967.

OTHER MACHINERY PATENTS

THE UNITED STATES

NO. 1,366,969 Machine for manufacturing articles of rubber and fabric. C. W. Steele, assignor to the Firestone Tire & Rubber Co.—both of Akron, O.

1,367,626 Tire repairing apparatus. J. Reinhardt, Norman, Okla.

1,368,478 Adjustable section and retread mold for pneumatic tires. R. A. Brooks, assignor by mesne assignments to Western Rubber Mold Co.—both of Chicago, Ill.

1,368,527 Core for pneumatic tires. F. Paulsen, Kansas City, Mo.

1,368,631 Expansible core for vehicle tires. A. Huetter, Dayton, O. (See THE INDIA RUBBER WORLD, March 1, 1921, page 433.)

1,368,641 Tire mold. T. Midgley, Springfield, assignor to The Fisk Rubber Co., Chicopee Falls—both in Mass.

1,368,679 Tire vulcanizer. A. Adamson, Akron, O.

1,368,862 Collapsible tire core. J. Traum, Coshocton, O.

1,368,929 Tire-building machine, with vertical adjustment. W. H. Hermann, Lancaster, assignor to The Herman Tire Building Machine Co., Columbus—both in Ohio.

1,368,933 Machine for the simultaneous slitting and artificial selvaging of fabrics. C. L. Hutchingson, assignor to Cameron Machine Co.—both of Brooklyn, N. Y.

1,369,080 Rubber mixer. D. R. Bowen, assignor to Farrel Foundry & Machine Co.—both of Ansonia, Conn.

1,369,260 Form and shield for facilitating the manufacture of rubber overshoes having metallic fastenings. C. H. Morrill, Swampscott, Mass., assignor to United Shoe Machinery Corporation, Paterson, N. J.

1,369,695 Apparatus and method for manufacturing cushion units for cushion wheels. J. J. Morand, assignor to Morand Cushion Wheel Co.—both of Chicago, Ill.

1,369,715 Tire-wrapping machine. C. Spreckels, San Diego, Calif.

THE DOMINION OF CANADA

208,233 Multiple vulcanizing press. The Goodyear Tire & Rubber Co., assignee of E. A. Nall, executrix of estate of E. Nall, deceased—both of Akron, Ohio, U. S. A.

208,234 Tire mold. The Goodyear Tire & Rubber Co., Akron, O., assignee of B. Darrow, Los Angeles, Calif.—both in U. S. A.

208,373 Apparatus for vulcanizing a plurality of tires whether of the same or different diameters. R. H. Rose, Cleveland, Ohio, U. S. A.

208,398 Apparatus for manufacturing solid tires. The Canadian Consolidated Rubber Co., Limited, Montreal, Que., assignee of W. J. Steinle, Elmhurst Heights, New York, U. S. A.

208,424 Air bag of knitted rubber-coated fabric. The Smith One-Heat System, assignee of C. L. Smith and E. S. Webster, coinventors—all of South Bend, Ind., U. S. A.

THE UNITED KINGDOM

152,987 Apparatus for manufacturing tires. The Goodyear Tire & Rubber Co., assignee of R. S. Trogner, 149 King Drive—both of Akron, Ohio, U. S. A. (Not yet accepted.)

152,989 Machine for withdrawing core from built-up tire casing. The Goodyear Tire & Rubber Co., assignee of H. A. Miller, 74 South Martha avenue—both of Akron, Ohio, U. S. A. (Not yet accepted.)

153,974 Press for molding rubber toys, etc. H. S. Golland, Dunstan, Westminster Road, Eccles, Lancashire.

154,551 Machine for mixing and kneading rubber. Farrel Foundry & Machine Co., assignee of D. R. Bowen, 5 Clover street, and C. F. Schnuck, 80 North State street—all of Ansonia, Conn., U. S. A. (Not yet accepted.)

154,664 Apparatus for molding and vulcanizing tire studs. Dunlop Rubber Co., 1 Albany street, Regents Park, London, and C. Macbeth, Fort Dunlop, Erdington, Birmingham.

154,684 Apparatus for vulcanizing tires. Dunlop Rubber Co., 1 Albany street, Regents Park, London, and C. Macbeth and W. E. Hardeman, Para Mills, Aston Cross, Birmingham.

155,016 Extrusion machine adapted to cut apart two solid tires when extruded in one piece. Refers to Specification No. 128,722. Dunlop Rubber Co., 1 Albany street, Regents Park, London, and A. W. T. Hyde, Fort Dunlop, Erdington, Birmingham.

155,086 Apparatus for making tires. D. Maggiora, Firenze, Careggi, Italy.

GERMANY

DESIGN PATENTS ISSUED, WITH DATES OF ISSUE

761,824 (October 23, 1920.) Press in five parts for making dental plates with several round rubber suckers. Hans Wetzler, Geleitstrasse 14, Offenbach a. Main.

764,238 (December 17, 1920.) Vulcanizing apparatus. Fr. Lindemann, Schleusingen i. Th.

PROCESS PATENTS

THE UNITED STATES

NO. 1,367,180 In the manufacture of pneumatic tires, painting the carcass at approximate juncture of tread and side-walls to prevent direct or indirect union, and subsequently curing the tire, B. Darrow, assignor to The Goodyear Tire & Rubber Co.—both of Akron, O. (Original application divided.)

1,367,231 Lining metal tanks with hard rubber. E. S. Boyer, Plainfield, N. J., assignor to American Hard Rubber Co., New York City.

1,367,496 Manufacture of resilient tires. A. J. Ostberg and A. Kenny, Richmond, near Melbourne, Victoria, Australia.

1,367,731 Method of vulcanizing rubber footwear. C. E. Bradley, Montclair, N. J., assignor to The Goodyear's Metallic Rubber Shoe Co., Naugatuck, Conn.

1,368,071 Vulcanizing rubber articles by immersion in liquefied metal; subsequent cooling, heating, cooling and melting of the metal, etc., to remove finished article. F. O. E. Stone, Akron, O.

1,368,682 Manufacture of rubber footwear under differential of pressures. J. Alm and J. Hughes, assignors to The Goodyear's Metallic Rubber Shoe Co.—all of Naugatuck, Conn.

1,369,240 Treating leather by impregnating with rubber cement from which a portion of the sulphur has been removed, and subsequently vulcanizing to unite the rubber and leather integrally. S. O. Hahn, Lincoln, Nebr., assignor to The Chrome Leather & Rubber Tire Co., Inc., Pueblo, Colo.

THE DOMINION OF CANADA

208,269 Covering tennis balls. A. G. Spalding & Brothers, Chicopee, assignee of Frank J. Faulkner, Lynn—both in Mass., U. S. A.

208,584 Manufacture of friction facing. The Canadian Raybestos Co., Limited, Peterborough, Ont., assignee of F. C. Stanley, Bridgeport, Conn., U. S. A.

GERMANY

PATENTS ISSUED, WITH DATES OF ISSUE

333,215 (March 30, 1920.) Manufacture of packing. Franz Masarey, Ziegelstrasse 26, Berlin.

333,729 (March 20, 1919.) Manufacture of stuffing-box packing. Hoffmann & Co., G. m. b. H., Essen, Ruhr.

DESIGN PATENTS ISSUED, WITH DATES OF ISSUE

762,520 (December 11, 1920.) Method for applying rubber to damaged parts of rubber hose. Wilhelm Schmauch, Frankenallee 29, Frankfort-on-the-Main.

763,432 (December 18, 1920.) Attachment of patch on rubber tread. Wilhelm Hauke, Polierstrasse 25, Dresden.

766,225 (December 11, 1920.) Method for cleaning damaged parts in hose. Wilhelm Schmauch, Frankenallee 29, Frankfort-on-the-Main.

New Goods and Specialties

RESPIRATOR WITH HOOD, FOR FUMES AND DUST

THE REQUIREMENTS of the industrial world today for protective equipment and clothing for its workers have resulted in the perfecting of a number of different types of gas-masks or respirators for use under specified conditions. The one illustrated is the sponge filter type for dust and light fumes. The hood is furnished in light dust-tight cloth for dust conditions or air-tight acid-proof cloth for work in fumes, spattering acid, etc. The hood is attached to the La-France respirator which features the rubber air face cushion adjustable to all shapes of faces. This rubber cushion is removable and the respirator is adjusted by a strap with sliding buckle outside the hood. This hood is used in poisonous dust, fume or acid conditions such as aniline, lead, etc., where face, head and neck covering as well as breathing protection is required. The skirt of the hood may be worn under the coat or other clothing if desired.—American-LaFrance Fire Engine Co., Inc., Elmira, New York.

AMERICAN-LAFRANCE SPONGE-FILTER HOOD RESPIRATOR

GOOD-LOOKING BABY PANTS

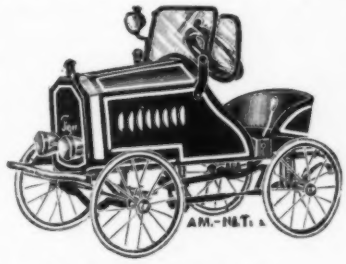
The variety of styles in rubber pants seems to be endless, and each new one puts forth additional claims to superiority besides the one that is common to them all—the entire suitability of sheet-rubber of good quality as the prescribed material out of which they are made. The ones pictured here, called the "Everychild," are manufactured by the same company as the "Everychild" wading bloomers described in our issue of August 1, 1920. They are made from medium weight natural-colored rubber and are gathered in a ruffle around the waist-band and leg openings. The reinforcement of these shirrings, which are marked by machinery to look like sewed shirrings, as well as the reinforcement of the seams, is vulcanized and no stitching is used. No strings or buttons are used, the entire garment being rubber. Particular attention is directed to the shape which, it is claimed, is different from previous models. The garment is made in three sizes.—Arthur Frankenstein & Co., 514-516 Broadway, New York.

"EVERYCHILD" BABY PANTS

RUBBER-TIRED AUTOMOBILE FOR LITTLE FOLKS

The joy of owning an automobile of your own is not confined to "children of an older growth." The little folks can now ride in rubber-tired comfort on non-skid wheels, with head-lights and windshields and all the accessories that go with grown-up automobiles. The juvenile automobile illustrated here is equipped with ½-inch corrugated solid rubber tires, mounted on 12-inch steel wire wheels. It is claimed that these rubber-tired wheels improve the appearance of the car and add a touch of realism; are quieter and prevent the well-known rattling sound of untired wheels; and make the machine run more smoothly and easily as well as more comfortably.

This company is also using the corrugated solid rubber tires on its coaster wagons, having been the originator of this idea, as it also was of using pneumatic tires on baby carriages.—The American-National Company, Toledo, Ohio.



RUBBER-TIRED JUVENILE AUTO

"NU-SEAL" GLASS-JAR STORAGE BATTERY

A new style glass-jar storage battery has been designed especially for farm lighting and power plants. These batteries are made in six sizes—88, 110, 120, 150, 180 and 210-ampere-hour capacity on the 8-hour rating. Intermittent basis adds 45 per cent to these capacities.

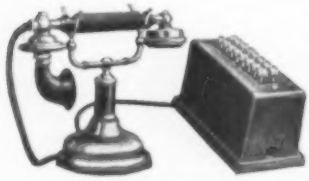
The construction of the jars is such that the hard rubber cover fits on the seat inside the jar with a thin layer of special sealing compound between it and the sides of the jar. By running a

"NU-SEAL" STRUCTURAL FEATURES

sharp, hot tool around the inside edge of the jar this cover is quickly removed. The cover is of the one-piece molded type with large screwed vent opening elevated to prevent spilled water or electrolyte running back into the cell, carrying impurities with it. This opening is fitted with a hard rubber threaded plug, making a tight and neat fit. It can be removed and replaced easily and does not need renewing as the soft rubber plug does. A tight fit around the strap post is assured by the use of a hard rubber flanged gasket shrunk on the strap post and forced down into a well filled with sealing compound. This eliminates leakage; also breakage in transit, due to the elements shifting and striking the sides of the jar.—Universal Battery Co., 3410 South La Salle street, Chicago, Illinois.

HARD RUBBER HANDLE FOR THE MICRO-TELEPHONE

The innocent-looking instrument which is the subject of this paragraph is reminiscent of those thrilling scenes at the cinema where the lady seizes with one hand this same hard rubber handle and holds the telephone in position for use while she scribbles madly with the other hand, writing down the information supposed to be coming in over the wire. The chief difference between the cinema 'phone and the one shown here is that this one is connected with the practical interphone device for communicating with different parts of the same building. The hard rubber handle is grooved and turned on the ends in a way to make it fit the hand comfortably.—Federal Telephone & Telegraph Co., Buffalo, New York.



Cradle-Switch Desk 'Phone

THE "ERROR-NO" COPYHOLDER

One of the newest copyholders for use by stenographers and typists is the "Error-No," arranged with either right or left-hand operating rod. It is provided with a horizontal arm resting on a rubber foot, which insures stability without the necessity for attaching to the desk or table, and permits moving the holder as desired. The roller which holds the copy or note-book is also provided with pieces of white rubber tubing which easily grip the paper.—Error-No, Inc., Rochester, New York; 298 Broadway, New York.

TOYS TO GO WITH NURSERY RHYMES

A British rubber company that certainly must have a warm sympathy for the whims of children and a keen appreciation of their love of the quaint and humorous in toys, has brought out what it calls the "Rubbadubdub Floating Toys." They are made of pure durable rubber, with fast colors and are easily inflated and deflated by means of a valve. Some of the characters are shown here, but the line is being increased, with the aim of providing children with toys of which they will not tire easily. A little booklet printed artistically in black and orange on cream-colored paper shows twenty-five of these toys, which are covered by registration of designs and trade-mark and on which the company has applied for patents. Each figure, bird or animal, is pictured over a verse similar to those in "Mother Goose."—J. G. Franklin & Sons, Limited, 17 Colverstone Crescent, Dalston, London, E. 8.

Lukkidukki Bird Humpty Dumpty King Swan

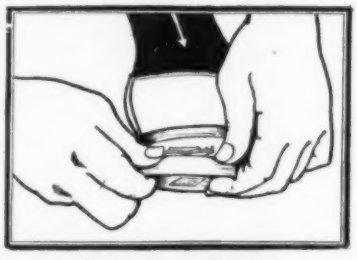
Doctor Beetle Pip Teddy Tail Penguin

INTERCHANGEABLE RUBBER HEELS

This interchangeable rubber heel consists of a light steel plate and a rubber heel grooved on the inside. When signs of wear appear, the left rubber heel is transferred to the right shoe and the right rubber heel to the left shoe. These heels are said to have an increased life of from one to two months because they always keep square. The leather sole of the shoe wears out more evenly and keeps its shape better with this style heel.

Steel Plate Attached

Wings Fitted Into Grooves



Springing the Fastener

The method of attaching is not complicated. The repairer removes the leather heel in the usual manner. The remaining lift, however, must be scoured absolutely smooth and flat, so that the cupped edge of the heel will make a tight edge when attached. The heel, with the plate already in it, is placed in position and a few taps of a hammer drive the plate into the leather. The plate is then removed and, separated from the rubber heel, is attached with nails. The wings of the plate fit into grooves in the rubber heel with a firm grip. The outer edge of the rubber heel is trimmed, then the rubbers are interchanged and any slight excess of rubber or leather is removed, thus insuring an equal fit on either shoe.

These heels are no heavier than ordinary ones, though they are bigger and an eighth of an inch deeper, which means longer wear. The rubber portion is renewable, using the same plate.—Wids Co., 1205 Little Building, Boston, Massachusetts.

THE FIRST TORONIZED TIRE

One of the newest tires is pictured here, which depends on its internal hydraulic expansion process in addition to the high quality of its materials to produce an oversize tire guaranteed against rim cuts, stone bruises and blow-outs.

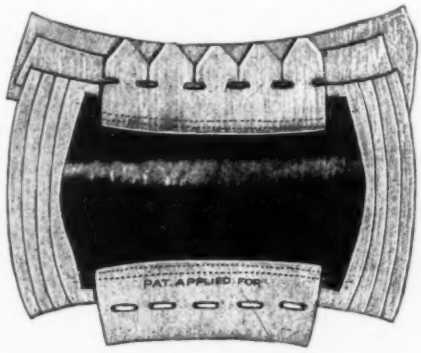
HYDRO-UNITED TORONIZED TIRE

The foundation of this tire is the new moisture-proof fabric treated by the patented toron process which is said to increase the tensile strength and friction and minimize the tendency toward oxidation and decay. An additional amount of rubber is calendered into this fabric, made possible because of the special affinity for rubber credited to toron. This process also protects the tire against the free sulphur which comes from ordinary vulcanized rubber. The toron process was described in THE INDIA RUBBER WORLD, October 1, 1920, page 26.

The "Hydro-United" tire is built over a three-piece collapsible core, for which is subsequently substituted a heavy fabric bag the exact size and shape of the inside of the tire. The uncured tire is placed in the mold which is closed by hand without external pressure and the mold placed in the vulcanizer. Water heated to vulcanizing temperature is then pumped into the fabric bag through a connection extending through the mold. A pressure of 200 pounds to the square inch produces a tire of uniformly united parts, perfectly vulcanized, without any exterior strain.—Hydro-United Tire Co., 10th street and Columbia avenue, Philadelphia, Pennsylvania.

NEW BLOW-OUT BOOT

The Fowler "Spear-Lock" blow-out boot comes to automobilists with a guaranty of a permanent repair that will not cut the tube, creep, blow out or bulge. This boot locks the tube within itself, taking the full strain of the air pressure. The rubber apron, which is an exclusive feature, takes up the friction, making it harmless, and, acting as a gasket, keeps out water, dirt and sand. The application of this boot is quite simple. The injured rubber and fabric is cut away, making a clean hole through the tire. The boot is placed on the tube about 18 inches to the left of the valve stem and inserted in the tire before inflating. The tube is then inflated enough to hold the boot in place until the tire is on the rim, and then inflated to full regular air pressure. The boot should extend at least three inches on each side of the hole. Ordinary length boots for 3-, 3½-, 4-, 4½- and 5-inch tires are, respectively, 9, 11, 12½, 13½, 14½ inches. Special lengths are 12, 14, 15½, 16½, 17½ inches, and extra special for 3½, 4, 4½ and 5-inch tires are 17, 19, 20 and 21 inches.—Fowler-Williams Co., 504 Exposition avenue, Dallas, Texas.



FOWLER SPEAR-LOCK BOOT

RUBBER-SOLED SHOES ADVOCATED FOR GOLF

Progressive sportsmen who like to see well-kept golf links have long deprecated the damage done to turf on the putting greens by some types of sports shoes intended to afford the player a firmer footing. Such will welcome the recent advocacy of rubber-soled golf shoes which obviate injury to the turf and the club-house floor as well as improve the player's game. Pliable and comfortable, at the same time that they furnish adequate security against slipping, the new types of rubber-soled golf shoes should find ready favor during the coming season.

GOLF WITHOUT LINKS

All the excitement of an eighteen-hole course without the attendant embarrassment of a "gallery" is promised the golfer who uses a newly patented substitute for a practice ball in the house or the back yard. This clever invention utilizes the elastic principle of rubber to provide a substitute for a golf ball, which after being hit immediately returns to its original position in readiness for another stroke, and requires no teeing-up. The construction provides for a rubber mat through which is cut a recess hole, out of which protrudes a rubber tongue of somewhat globular form and of the same dimensions as the average sized golf ball. This rubber tongue is firmly held by a countersunk screw at the same height above the mat as a golf ball when teed-up. When hit by the club the rubber tongue flattens out against the mat and, as soon as the club passes over it, springs back to its original position. Its use is said to perfect a golfer's stroke and to provide a maximum of practice with a minimum amount of lost motion.—Edward J. Vogel, San Francisco, California; United States patent No. 1,363,446.

PRACTICE GOLF BALL SUBSTITUTE

RUBBER-TIRED WHEELS FOR THE "KIDDIE-KAR"

The story of the man who made stereoscopes—and still makes them—but left his work one day to make his small boy a strong wheeled toy that would not easily wear out, is only one of the interesting "real life" bits that furnish the color and romance in modern business success. When the small boy ventured forth with his new vehicle, all the other small boys wanted one like it, and father was forced into a new line of business.

The almost instant success of the "Kiddie-Kar" with its solid-looking wooden wheels was only the forerunner of the greater success that would come to it when equipped with "real rubber tires." The "Kiddie-Kar Special," as the new model is called, has double disk electrically welded steel wheels with dust-proof roller bearings, and these wheels are fitted with large rubber tires in sizes from ½-inch on the No. 1 model to ¾-inch on the No. 5. The finish of the wheels is baked red enamel and of the "Kar," red and cream. These toys are packed one dozen in a crate, with the exception of No. 5, which is packed by the half-dozen.—H. C. White Co., North Bennington, Vermont; 200 Fifth avenue, New York.

NEW "SPECIAL"—RUBBER-TIRED

THE EDITOR'S BOOK TABLE

"ESTATE RUBBER. ITS PREPARATION, PROPERTIES AND Testing." By Dr. O. De Vries, Director of the Central Rubber Station, Buitenzorg, Java. Drukkerijen Ruygrok & Co., Batavia, 1920. Paper, 649 pages, 6 by 9½ inches.

THIS TIMELY VOLUME by a recognized authority on plantation rubber treats systematically the preparation of plantation rubber from latex to final product, and indicates the methods necessary to obtain good, uniform and cheap rubber.

There are chapters on the treatment of latex preliminary to coagulation; the theory and practice of coagulation; the structure and properties of the coagulum and the importance and composition of serum; the details of preparation of crêpe and sheet rubber. Other chapters relate to smoked sheet and crêpe; keeping qualities of rubber and defects that develop; the general properties of lower grades; the Brazilian method of preparation; special methods of preparation; common but incorrect opinions on rubber preparation; methods of testing the physical and chemical properties of crude rubber, and judging rubber from the exterior.

The book ends with a list of publications devoted to rubber and its manufacture and an excellent index of subjects. This book is a valuable contribution to the literature of the technology of plantation rubber.

"RUBBER MANUFACTURE." BY H. E. SIMMONS, PROFESSOR OF Chemistry, Municipal University of Akron, Ohio. D. Van Nostrand Co., New York. Cloth, illustrated, 149 pages, 7 by 11 inches.

Professor Simmons has put into book form his series of articles which appeared in one of the rubber trade journals three years ago.

In a series of twenty chapters will be found a concise treatment of crude rubber, its history, wild and cultivated sources, colloidal relations, preparation, constitution, synthesis and chemical and physical testing. This portion is followed by chapters on the manufacture and use of inorganic fillers, organic accelerators and rubber substitutes, theories of vulcanization and methods of reclaiming rubber. The chapters on rubber manufacturing deal with the preparation of the crude material, and the principles of compounding. In the last two chapters the chemical analysis of manufactured rubber and physical testing of vulcanized rubber are considered. An appendix is devoted to the laboratories and equipment of the Municipal University of Akron. The book is well worth a good index, but has none.

"TIMES OF CEYLON GREEN BOOK, 1921." THE TIMES OF Ceylon Company, Limited, Times Building, Colombo, Ceylon. Cloth, 802 pages, 4½ by 7 inches.

This volume contains general information on Ceylon, together with an up-to-date map of the island; also a chart showing times throughout the world when it is noon in Colombo, and directories under divisions—Official and Professional, Mercantile Section, Classified Occupations, Institutions and Clubs, Estates and Companies, Men's Section, Ladies' Section, Foreign Directory and Necrology covering the period from 1914 to 1920.

The information is up to date and its alphabetical arrangement under the main heads enables it to be secured at once.

"WHAT A COST SYSTEM SHOULD DO FOR YOU." A BROCHURE issued gratis by the Fabricated Production Department of the United States Chamber of Commerce, Washington, D. C. Seven pages, size 6 by 9 inches.

With the gradual resumption of production to meet a reviving demand, and after the post-bellum slackening has run its course, competition is again certain to become keen, and war-time margins but a memory. It follows then, in the opinion of the national board of commerce that the industry that will best survive in its class will be the one that not only produces a superior article and is adept in marketing its products, but which can demonstrate its profit through sheer efficiency and an accurate accounting of costs. Most business concerns fail, it is claimed, because they either do not know or they disregard the question of costs. Some excellent headway has already been made in the rubber industry in conducting such records, but there are still many in the trade who have not yet given the matter the attention its importance merits; and to them is the brochure commended.

"SAFETY LESSONS FOR AUTOMOBILE DRIVERS." COPYrighted and published by the National Safety Council, 168 North Michigan avenue, Chicago. Complete in a set of twelve lessons and twelve illustrated safety bulletins obtainable from the Council for a nominal charge.

A concise series of safety precepts to lessen hazards to automobilists and the general public, covering details of car construction, tire and other equipment, and the loading and handling of all kinds of pleasure and business motor vehicles.

Even an experienced motorist needs to be reminded that a blowout, especially on a front tire, and when speeding may upset a car or cause some other serious accident; that running with a soft tire is dangerous, especially on a front wheel, and if the rims are of the quick-demountable type, as steering is made harder, extra power is needed, and the tire may even be thrown off the rim; that split rims need to be securely locked and wedges screwed tight; that over-inflation is unsafe, as tires testing 60 pounds on inflation may show 70 pounds after a hard run on a hot road; that where wire wheels are used they should be securely locked, all spokes tight, and wheels well alined; and that wheels should never be locked on applying brakes, as it increases tendency to skid and subjects tires to severe road grind.

"CRAIN'S MARKET DATA BOOK AND DIRECTORY OF CLASS, Trade and Technical Publications." By G. D. Crain, Jr., 417 South Dearborn street, Chicago, Illinois. First edition, 1921, cloth, 462 pages, 6 by 9 inches.

This book contains a most complete list of trade publications, accompanied by interesting data on the trade reviewed, all arranged alphabetically. Among the publication listings those appealing to our readers are: Automotive, Chemical Industries and Tires and Rubber.

The book has three indices: Advertisements, Markets and Publications.

NEW TRADE PUBLICATIONS

THE ADAMSON MANUFACTURING CO., EAST PALESTINE, OHIO, manufacturer of automobile accessories and specialties, has issued pamphlets descriptive of Adamson portable vulcanizers for tires and inner tubes; foot accelerators for Ford cars; brake-shoes for Ford, unlined and lined; and a simple and effective oil cooler for Fords which is readily bolted to the bottom of the engine crank case.

BINNEY & SMITH CO., 81 FULTON STREET, NEW YORK, MANUfacturers of carbon black for rubber manufacturers, has issued a brochure entitled "The Black Art of Rubber Compounding, Chat No. 2," illustrated by half-tone reproductions of microphotographs, which should prove of much interest to rubber manufacturers.

THE JEFFREY MANUFACTURING CO., COLUMBUS, OHIO, HAS JUST issued Catalog No. 257 on Jeffrey standardized scraper conveyers. The catalog features both single and double strand conveyers designed to handle all kinds of loose products in manufacturing and mining industries, power plants of rubber mills, sugar mills, retail coal yards, canning plants and practically all other industries. It is profusely illustrated, contains numerous tables of specifications and dimensions, and, with the instructive descriptive matter, easily enables not only an engineer but a purchaser more or less unfamiliar with engineering problems to select the right

conveyer for his needs. Copies of the catalog will be sent free upon request to the maker by interested persons.

The Brown-Wales Co., Fargo and Egmont streets, Boston, has issued a handbook entitled "Steel," which covers a great variety of structural materials among which are iron and steel bars, floor and tank plates, corrugated sheets for roofing, asphalt shingles, ventilators and wire. A copy of this ready reference book will be sent to rubber engineers upon request.

The Hood Rubber Products Co., Inc., Watertown, Massachusetts, is mailing to the trade a handsome 56-page buying guide of rubber footwear for 1921 and a 64-page buying guide of canvas footwear. Both are profusely illustrated, printed in two colors and depict a profusion of attractive styles. The former includes net prices to the retailer.

"Patent-Sense," published by Lacey & Lacey, United States and foreign patent attorneys, 639 F street, Northwest, Washington, D. C., is a pamphlet which will be of interest to inventors and manufacturers, as it deals with the patenting of inventions.

The Columbus Rubber Company of Montreal, Limited, Montreal, Canada, has issued an attractively arranged catalog on their "Made to Wear Well" rubber footwear for the season of 1921-1922. The Santa Maria brand includes boots, lumbermen's, fine Jersey overs, and light specialties in footwear for men and women. The Columbus branch includes boots, lumbermen's, excluders and light overs. It is printed in black and red in separate editions in the English and French languages, meeting the requirements of the French-Canadian trade.

Ames Holden McCready, Limited, Montreal, Canada, is distributing to the Dominion shoe trade its 1921-1922 illustrated catalog of rubber and tennis footwear. In parallel columns of English and French text concise specifications of the goods are given. The range of types and styles is comprehensive and the quality of all is guaranteed to outwear any pair of similar shoes of any other make, sold at the same price and worn under the same conditions. The various lasts are shown in several pages of profiles and plans, in half-tone and outline. The catalog is a fine example of two-color printing and was designed with an expert's knowledge of shoe trade requirements.

INTERESTING LETTERS FROM OUR READERS

WHAT THE COMPOUNDER AND LABORATORY MAN CANNOT DO

To the Editor:

Dear Sir: In all rubber factories whenever anything goes wrong with a stock, the first impulse is to tell the trouble to the compounder, or refer to the compound book, or damn the laboratory. Without trying to absolve the originators of compounds and processes, from all blame, because they are human and fallible, I do want to point out that they are often made the convenient scapegoats for sins of the factory. Because brevity was never so much a virtue as in these days of hustle, I will confine my argument to one illustration only.

Assuming a stock which has been working well and showing a good test, suddenly goes wrong and fails under test, what can happen to it, in the factory to make it go wrong? Well:

1. The compound man may use wrong ingredients or wrong weights. Of course each batch should be checked, but is it? Echo answers; "Is it?" Frequently a test for specific gravity shows it is not.

2. The mixing man may overwork or underwork the rubber before adding the powders. This breaking down process should be very carefully controlled. Then he may dump in the powders and not half mix them, because he happens to be paid piece work, or may loaf on the job if paid day work. Also, he may scorch the stock, or work it to death, or he may use the rubber for one stock and the powders for another. Of course, he should be checked, but is he? And echo answers, "Is he?" Sometimes the laboratory man is able to prove that he is not, but the laboratory man cannot check each batch. That is not laboratory work.

3. The calender man can do all sorts of things which he shouldn't do. He can burn the stock or destroy its nerve and vulcanizing properties by letting it work itself into semi-liquid mud, or fail to give his rolls the right set to squeeze through the duck or bedevil the stock in several other ways, perhaps quite innocently, but none the less effectively. Does he do these things? And echo answers, "Does he?" The laboratory man knows he does, but he cannot check this operation.

4. The duck drying man can fail to thoroughly dry the duck or dry it and forget to keep it dry or make it only partly dry like the Volstead law or as bone-dry as Sahara, or a Scotch Presbyterian sermon, and then set it to recover under a leaky roof where for one devil of moisture driven out seven new lively little devils enter and dance with unholy glee. Does he do such things? And echo answers, "Does he?" The laboratory man says, "I'll say he does."

5. The press man may neglect to keep his inlet valve well open and his exhaust circulating freely so that he has nice stagnant pockets and pools of water in the plates instead of brisk dry steam, or he may fail to watch his temperature and time charts or use a 5/32-inch gage bar to get a ¼-inch squeeze, or overfill his press area, or not notice that the hydraulic pressure has gone on strike or has a fit of indigestion, or he can burn the belt or stretch the daylights out of it and otherwise gently manhandle it. Does he? Oh, does he?. This writing man says: "I'll say he does—I'll tell the world he does."

Then the factory superintendent promptly refers to the never failing compound book to discover what, if any, changes have been made. If none, he is stupefied, but if there's so much as one minor unimportant alteration, that's his "alibi." That lets him out. Does the compounder ever make mistakes? Oh, yes! Is his judgment always right? Oh, no. Is he always to blame? Most emphatically he isn't. What's the answer? Now, don't say "Search me," or "I give it up," because it is staring every man in the factory right in the face and it is no "alibis," "no passing the buck," but sensible, honest team work.

Arthur E. Friswell.

Jersey City, New Jersey.

THE ACCELERATED AGING OR LIFE TEST OF RUBBER

To the Editor:

Dear Sir:—Your columns under the heading "What the Rubber Chemists Are Doing," are always of interest and never so much so as recently.

Part of my work is compounding rubber to meet specifications for rubber-lined fire hose, air-brake hose, packings, etc., where not only are there imposed limitations for weight, tensile strength, elongation, permanent set, free sulphur, acetone and chloroform extracts, etc., but in some cases, for loss of strength and elasticity when samples are subjected to the test forming the subject of this letter.

The question is, what if anything, does this test actually amount to? One chemical consultant is on record that a week of these conditions equals approximately a year's normal exposure. The Bureau of Standards does not lay down any dictum, but the test is part of their equipment. The Underwriters' Laboratories insist upon it. The Associated Factory Mutual does not attach much importance to it. Some chemists with whom I have talked casually regard it as of some value in forming comparisons, but not as at all analogous to normal exposure. Others seem to think it is too good a thing to discard, as it may lead to something more definite.

My own experience has been that where a lot of rubber has proved weak by vulcanized test, goods made from it develop

greater weakness under this so-called "life test" than do goods made from stronger, better lots of rubber, but—here is a curious apparent anomaly—goods containing a certain percentage of resinous and bituminous substances, pitches, vulcanized oils, etc., debarred by the chemical tests imposed by specifications, frequently show up better in the so-called "life test" than do those in which such substances have not been introduced. Again, goods in which the free sulphur content is greater than the specifications permit, often test better after this accelerated aging process than do goods in which the free sulphur is kept within the specified limits. The subject is both puzzling and interesting.

Physical tests before and after this so-called life test, indicate variations in strength of plantation rubbers of the highest grade, which so far seem to be quite beyond ordinary factory control. I know that such strength variations in actual service are by no means as serious as laboratory figures, regarded only as figures or curves, appear to indicate, but they exist, and it seems to me that candid expressions of opinions through your columns, based upon actual experience, would prove to be not only of great interest, but of mutual assistance.

SUPERINTENDENT.

CONTRACT CANCELLATIONS CONDEMNED

TO THE EDITOR:

DEAR SIR: We have read your editorial as to contract cancellation in your March issue, with which we cannot feel in any way in accord. The time to make a contract fair is when the two parties are contracting for it, and not after the contract has been signed. The privilege which you seem to uphold of one party arbitrarily changing the contract because the market has made it unprofitable for him to continue, is one which will strike at the root of all business honesty.

No one has been obliged to make contracts unless they felt it to their advantage to do so, and the fact that their judgment is wrong, does not justify them in cancelling them. A year and a half ago many contracts held by the sellers became very unprofitable to them, by reason of the advance in the market. The sellers carried out their contracts, as the buyers should do now.

We agree that so far as deliveries and financing are concerned, the buyer and seller should work thoroughly together, and that each one should do what he can to make the burdens of the other light enough to be carried, but the matter of cancellation merely because the contracts prove unprofitable, is a different matter, and has never been the policy of American business.

We are writing you as readers of your magazine, and we have taken a great deal of pride in it, and therefore feel that we are entitled to dissent from the view expressed.

Meanwhile, we should like to say that for ourselves there has been no epidemic of cancellation in the rubber industry. We have not even been asked to cancel a contract, and consider this a distinct honor to the industry, but the encouraging of cancellation of contracts is a policy which we think ought to be condemned by a representative trade paper.

J. SPENCER TURNER COMPANY.
John E. Rousmaniere, President.

New York, March 11, 1921.

TO DEMAND ZINC TIRES

TO THE EDITOR:

DEAR SIR: While it is true that much more mileage is built into tires than formerly, yet it is also a fact that still too many tires, even among those of so-called standard make, fail to reach a reasonable age in fair condition. Motorists often wonder why, in comparing two makes of tires selling at a good price, one should last long and give very good service while the other proves to be very disappointing. The fact is that most motorists know much more about judging cars and their mechanism than they do about tires. Exacting in the choice of the former, they only too often take the latter wholly on faith. When a tire fails them they usually attribute the trouble to weakness in the shoe's construction.

Personally, I believe that the average well-made fabric or cord reinforcement in a tire serves its purpose very well. When a breakdown occurs the fault will be found generally in the rubber compound used in the tread and sidewalls. Pure crude rubber must, of course, be incorporated with other substances to make it serviceable for tire needs; but, though numerous fillers are used, the really worth-while ones are very few. The trouble with most fillers is that there is an inter-friction among their particles, which work on one another under service and heat the rubber compound to such an extent that it gets over-cured, scales, loses its life, becomes brittle, and dries or crumbles from its reinforcement, causing cracking, blowouts, etc.

While not denying that some fillers have real merit, my experience, confirmed by exhaustive tests, is that the most satisfactory results are obtained with a zinc oxide tire compound. A rubber company at Akron ran two tires at either side of a car on a 10-mile road covered with ice and snow. One tire had a proper proportion of zinc oxide, the other had no zinc in it. When the latter was examined at the end of the run it was found badly cut, but the zinc tire was unblemished. Compounding materials come and go, but for all-around merit in adding toughness and tensile strength to tire rubber zinc oxide is still unrivalled.

The color of the tire is more or less due to the filler used. As zinc oxide is white, the resulting tire is usually white or light gray, but color is not always a certain indication, since zinc oxide, because of its recognized value, is utilized in restricted percentages as a filler in many black tires.

The buyer is the ultimate arbiter. What he demands the maker will perforce supply. If he takes without question what is offered he will get what is easiest and cheapest to make. If he demands a zinc tire, he will get a zinc tire and his money's worth in service and satisfaction.

C. A. STEDMAN.

160 Front Street, New York.

RUBBER TRADE INQUIRIES

THE inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The Editor is therefore glad to have those interested communicate with him.

(851) An inquiry has been received for a formula for a substitute for chicle in manufacturing chewing gum.

(852) A reader asks for sources of information concerning manufacture of dipped goods.

(853) Request is made for the addresses of manufacturers or jobbers selling paper in rolls to fit the Pierce tire-wrapping machine.

(854) A chemical house asks for information concerning "Non-Blow," used by the rubber industry.

(855) Request is made for the addresses of manufacturers of golf-ball winding machines.

(856) A foreign manufacturer desires addresses of manufacturers of uncovered balls for making into tennis balls.

(857) A reader inquires for the addresses of manufacturers of felt for covering tennis balls.

(858) A correspondent desires to purchase a bulb-spray for testing waterproof material.

(859) The address of the manufacturers of Rubies' plastic pitch is requested.

(860) Addresses of manufacturers or jobbers who handle molded rubber gloves containing lead, suitable for X-ray work, are desired.

TRADE OPPORTUNITIES FROM CONSULAR REPORTS

Addresses may be obtained from the Bureau of Foreign and Domestic Commerce, Washington, D. C., or from the following district or cooperative offices. Requests for each address should be on a separate sheet, and state number.

District Offices.	Cooperative Offices.
New York: 734 Customhouse.	Cleveland: Chamber of Commerce.
Boston: 1801 Customhouse.	Cincinnati: Chamber of Commerce; General Freight Agent, Southern Railway, 96 Ingalls Building.
Chicago: 504 Federal Building.	Dayton, Ohio: Dayton Chamber of Commerce.
St. Louis: 402 Third National Bank Building.	Los Angeles: Chamber of Commerce.
New Orleans: 1020 Hibernia Bank Building.	Philadelphia: Chamber of Commerce.
San Francisco: 307 Customhouse.	Portland, Oregon: Chamber of Commerce.
Seattle: 848 Henry Building.	

(34,435) A commercial representative in Cuba desires to secure exclusive agencies for the sale in Latin American countries of rubber goods and druggists' sundries. Quote f. o. b. New York or southern port. Correspondence and advertising matter should be in Spanish.

(34,471) The office in the United States of a publishing house in Spain desiring to increase circulation by giving premiums, desires to be placed in touch with manufacturers of suitable goods, including fountain pens, office appliances. etc. Purchases on cash basis.

(34,475) Commercial representative of drug and hospital trade in Mexico desires agencies from manufacturers for sale of druggists' sundries, rubber goods, and allied lines.

(34,476) Mercantile firm in Canada desires to purchase leather and rubber belting.

(34,488) A manufacturer in Jugoslavia desires to purchase 100 long tons of asbestos yearly. Quote c. i. f. Hamburg or Trieste.

(34,489) A mercantile agency in Ireland desires to secure agency for sale of high-grade automobile tires.

(34,495) A firm in the Netherlands desires an agency for the sale of all technical chemicals. Quote c. i. f. Netherland port. Payment against documents on arrival of goods.

(34,497) A commercial agent in Brazil desires to hear from American firms with view to securing representation for sale of rubber goods in Brazil.

(34,511) A merchant in France desires to secure an agency for the sale of tires, tubes, and automobile accessories. Quote c. i. f. French port. Correspondence in French.

(34,533) A merchant in India desires to be placed in communication with firms for the purchase of novelties, sporting goods, bicycles, motorcycles, and automobiles and accessories. Quote c. i. f. Indian port.

(34,542) A company of manufacturers and importers in India desires to be placed in connection with firms for the importation of electrical goods, bicycles and motorcycles, telephones, printers' supplies, toys and novelties.

(34,551) A firm of importers in England desires to be placed in communication with manufacturers of toys.

(34,553) A firm in Italy desires to secure an agency for the sale of automobiles and accessories, vacuum cleaners, and electrical household appliances. Quote c. i. f. Italian port. Correspondence in French or Italian.

DISTRIBUTION OF TIRE SALES

The following table, compiled by the United States Tire Co., gives the average monthly sales of automobile tires compiled from the statistics of many years' observation.

Month	Per Cent	Month	Per Cent
January	4	July	14
February	5	August	12
March	5	September	10
April	9	October	5
May	13	November	4
June	15	December	4

It will be seen from this table that 64 per cent of the sales of the year are made between May 1 and October 1.

THE OBITUARY RECORD

ACTIVE IN STANDARDIZING RUBBER ANALYSIS

ERNST J. LEDERLE, founder of the Lederle Laboratories, died at Goshen, New York, March 7, 1921, after unsuccessfully endeavoring to restore his broken health since 1916 when he retired from active participation in official and professional work.

Dr. Lederle was born on Staten Island, New York, in 1865. He received the degree of Ph. B. in 1886 from the School of Mines of Columbia University, of Ph. D. in 1895 and Sc. D. in 1904 from Columbia University.

From 1889 to 1902, Dr. Lederle was chief chemist of the Department of Health, New York City, then Commissioner of Health during Mayor Low's administration. He reorganized the department and placed it upon its present modern and thoroughly scientific basis. In 1904 he established the Lederle Laboratories to render technical and scientific service to official and private organizations of a wide variety and type of activities. The firm of Lederle & Provost, covering the field of sanitary and hydraulic engineering, was established. He was a member of the Water Supply Commission and also chief sanitary expert and adviser on the construction work on the Catskill Acqueduct and its associated reservoirs. He was also the founder of the Lederle Antitoxin Laboratories, manufacturer of biological products, vaccines, etc.

In addition to the industrial problems which were studied by Dr. Lederle and his associates in the institution that he founded were many problems of the rubber industry, the chief of which was the standardization of methods of rubber analysis. The institution was particularly active and favorably known in this field.

PROMINENT IN THE CHEMICAL TRADE

Jacob Hasslacher, well known in chemical circles and one of the founders of the chemical firm of Roessler & Hasslacher, New York City, died at his New York home on March 15, in his sixty-ninth year.

He was born in Ems-on-the-Lahn, Germany, in 1852 and received his education in that country. Coming to New York in 1884, he established with Franz Roessler the firm of Roessler & Hasslacher, manufacturing and importing chemists, the copartnership being incorporated under the present name of the Roessler & Hasslacher Chemical Co. in 1889. Under the able guidance of Mr. Hasslacher the business grew to its present eminence.

Mr. Hasslacher was identified with many organizations for the advancement of the arts and sciences, also a member of numerous business and social clubs. Forceful, liberal, charitable, an ardent American, his passing is regretted by many friends.

A VETERAN CITIZEN OF AKRON

J. W. Chamberlain, one of Akron's oldest and best-known rubber machinery men, died suddenly last month in Akron. An appropriate obituary will be published in our next issue.

ADJUDICATED PATENTS

TEE PEE RUBBER CO., INC., vs. I. T. S. RUBBER CO. United States Circuit Court of Appeals, Ohio.

The Tufford reissue patent, No. 14049, for a rubber heel, claims 7, 9, and 10 construed and the peculiar concavity indicated by the suction effect of the construction shown; held, a limitation of all claims essential to show invention over that of a prior patent, also held, not infringed.—*Federal Reporter*, volume 268, page 250.

JUDICIAL DECISIONS

GAMMETER vs. BACKDAHL. Court of Appeals, District of Columbia. Decided June 2, 1920.

The decision in this case, reviewed in THE INDIA RUBBER WORLD, September 1, 1920, may be found in full in the *Federal Reporter*, volume 267, page 347.

History of The Goodyear Company

THE GOODYEAR TIRE & RUBBER CO. was incorporated in August, 1898, under the laws of Ohio, with $100,000 capital, to make and sell rubber goods. The incorporators were: David E. Hill, president; George R. Hill, vice-president; Henry B. Manton, treasurer; Frank A. Seiberling, general manager; Samuel S. Miller, superintendent. Mr. Seiberling had been secretary of The India Rubber Co., of Akron, since its organization, and Mr. Miller had been superintendent of the same company.

The plant of the Akron Woolen & Felt Co., affording 50,000 square feet of floor space, was purchased and equipped, and with an operating force of about 100 a beginning was made in the manufacture of bicycle tires and solid and cushion carriage tires which were sold direct to the carriage trade. The first year's gross business was $527,080, the factory being operated night and day in 1899 to turn out 4,000 bicycle and two tons of vehicle tires daily. Plant facilities were accordingly enlarged and the capital stock twice increased.

In 1904 the company found itself in financial difficulties, and as part of the plan of reorganization, the capital stock was changed from $1,000,000 common, of which only half had been issued, to $500,000 common—of which about $150,000 was surrendered in the final settlement, and $500,000 six per cent cumulative preferred. There were also issued $300,000 in first mortgage 10-year six per cent bonds, against which it was stated the company had assets approximating $800,000. Creditors were offered the option of surrendering their claims for 40 per cent in bonds and 60 per cent in preferred shares, or 20 per cent in cash and 80 per cent in bonds, the company having the right to redeem these securities at any time. The company's entire note indebtedness was taken up with $245,500 in bonds.

Following the reorganization the directorate was as follows: L. C. Miles, president; Charles Dick, vice-president; Charles W. Seiberling, secretary; H. B. Manton, treasurer; F. A. Seiberling, general manager; A. W. Firestone and F. G. Carnahan. Four years later the directorate was as follows: F. A. Seiberling, president and general manager; Charles W. Seiberling, vice-president; G. M. Stadelman, secretary; Frank H. Adams, treasurer; Paul W. Litchfield, superintendent; James P. Loomis and Henry B. Manton. With few changes other than the promotion of men long in the company's service this management has continued up to the present time. In 1915 Paul W. Litchfield was elected vice-president in charge of production; G. M. Stadelman, vice-president in charge of sales; and A. F. Osterloh, secretary. In 1917 W. E. Palmer was elected treasurer, but was succeeded at the end of 1920 by T. Jackson, representing the new banking interests.

After the reorganization in 1904, frequent increases were made in the capital stock to finance plant extensions, increasing raw material purchasing and to reimburse shareholders for earnings devoted to capital purposes. The financial expansion of the company is concisely indicated by the following table showing the successive increases of its capitalization:

	Total Authorized	Common	Preferred	Total Issued	Common	Preferred
1898	$100,000	.....	.....	$45,000	.....	.....
1899	200,000	.....	.....	.....	.....	.....
1902	1,000,000	.....	6% cum.	500,000	.....	.....
1904	1,000,000	$500,000	$500,000	.....	.....	.....
1908	2,000,000	1,000,000	1,000,000	.....	.....	.....
1910	6,000,000	1,000,000	1,000,000	3,286,100	$2,286,100	$1,000,000
1911	6,000,000	5,000,000	1,000,000 7% cum.*	3,284,100	2,284,100	1,000,000
1912	15,000,000	10,000,000	5,000,000	10,026,700	5,026,700	5,000,000
1914	15,000,000	10,000,000	5,000,000 7% cum.†	14,991,110	7,991,110	7,000,000
1915	25,000,000	17,000,000	8,000,000 7% cum.	15,027,200	8,377,200	6,650.000
1916	50,000,000‡	25,000,000	25,000,000	35,000,000	17,500,000	17,500,000
1917	50,000,000	25,000,000	25,000,000 7% cum. 25,000,000 8% cum.	44,672,320	20,278,620	24,393,700 7% cum. 23,783,800 8% cum.§
1918	100,000,000	50,000.000	25,000,000	59,250,600	20,466,800	15,000,000 7% cum. 23,173,900 8% cum.‖
1919	200,000,000	100,000,000	100,000,000 7% cum.	57,428,900	20,757,600	13,497,400
1920	.....	.....	.....	.....	61,890,000	66,844,100
1921	.....	.....	.....	.....	61,111,650	65,497,700

*Retirable after 1915 at $120.
†A portion set aside for employes on easy payments. The company began this year to retire preferred stock at the rate of about $250,000 annually.
‡To take care of a 100 per cent common stock dividend of $8,427,000, and to replace the former preferred issue retired by redemption.
§Seven hundred and sixty-seven thousand dollars additional was reserved for employes on partial payments.
‖Of which $347,100 was reserved for employes on partial payments.

The corresponding industrial growth of the company is shown by the following table of totals from the balance sheets for fiscal years ending October 31:

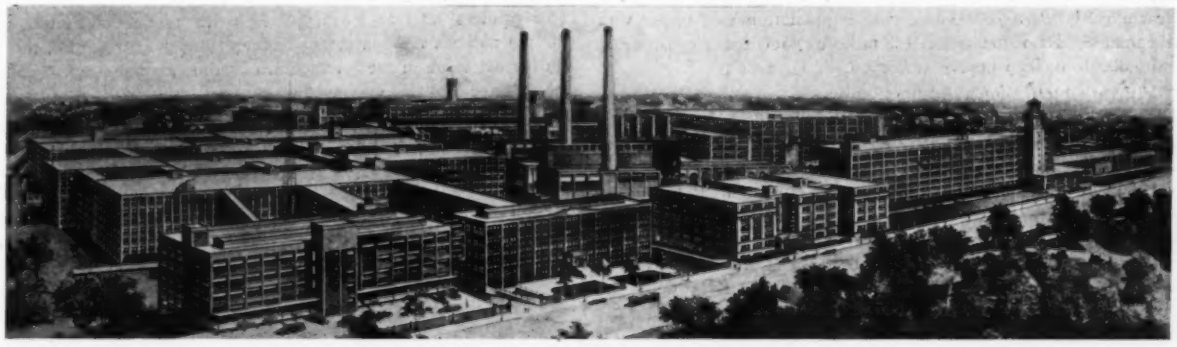
	Gross Sales	Net Earnings	Total Assets and Liabilities	Surplus	Reserve	Dividends Preferred	Dividends Common
1899	$527,080	.....	.....	.....	.....	.....	.....
1908	2,189,749	$120,925	.....	.....	.....	$10,308	.....
1909	4,277,067	651,687	$2,597,988	$223,256	$606,555	17,620	$49,200
1910	9,560,145	1,406,105	4,612,005	243,642	255,178	43,034	120,000
1911	13,262,266	1,291,625	6,953,769	1,119,752	710,241	70,000	274,092
1912	25,232,207	3,001,295	13,818,214	1,856,859	818,219	139,605	603,192
1913	32,998,827	2,041,268	18,858,251	2,820,071	1,367,391	350,000	604,056
1914	31,056,129	3,391,165	21,459,335	4,052,395	1,747,745	431,666	958,933
1915	36,490,652	5,137,083	26,279,927	7,031,940	2,276,187	469,583	1,686,151
1916	63,950,400	7,003,330	49,217,794	2,253,167	2,796,654	764,239	1,261,332
1917	111,450,644	14,044,206	82,562,592	12,763,681*	4,000,062	1,499,040	2,228,342
1918	131,247,382	15,388,191	93,619,018	20,717,356*	5,567,579	2,199,736	2,451,816
1919	168,914,983	23,277,245*	120,276,832	33,332,666*	7,729,782	2,813,940	2,489,355
1920	205,000,000	.....	.....	.....	.....	.....	.....

*Subject to Federal taxes.

In 1911 the common stock was paying 12 per cent. In 1912 common stockholders received a 100 per cent common bonus and the right to subscribe for $341,800 new common at par. The old preferred was retired at $105 and holders were allowed to subscribe for the new preferred share for share at par. A speculative fever placed fictitious values on most Akron rubber stocks and Goodyear common went as high as $460. In 1916 common stockholders received a 100 per cent stock dividend of $8,427,000.

From a small beginning in the manufacture of bicycle and carriage tires only, the scope of the business was broadened rapidly. In 1901 pneumatic carriage tires became an important product, a line of soft rubber specialties was added, and in 1903 golf ball manufacture was begun. Meanwhile the automobile was coming into prominence and the company became one of the leaders in the manufacture of both pneumatic and solid tires for passenger and commercial cars, a position which it has occupied ever since. The company's products in 1904 included rubber tiling, druggists' sundries and horseshoe pads.

In 1911 some 3,300 employes were turning out daily 100,000 pounds of products, including 3,500 automobile tires, 500 motorcycle tires and 30,000 pounds of solid tires. There were 55 branches in the United States and 11 in Canada, some separately incorporated and many in buildings owned by the company. Branches were opened in Mexico City in 1912, also in Argentina, Australia, and India in 1915, and the company has long devoted much attention to foreign business. In 1910 the Goodyear Tire & Rubber Co. of Canada, Ltd., was incorporated with $250,000 capital and the Durham Rubber Co. at Bowmanville, Ontario, acquired. In 1916 a new plant was built at Toronto. The present capitalization of the Canadian company is $30,000,000, half common and half preferred. In 1912 plans were made for a complete $1,000,000 rubber plant in Rio de Janeiro, Brazil, to take care of South American business and also to prepare crude rubber for use in Akron.

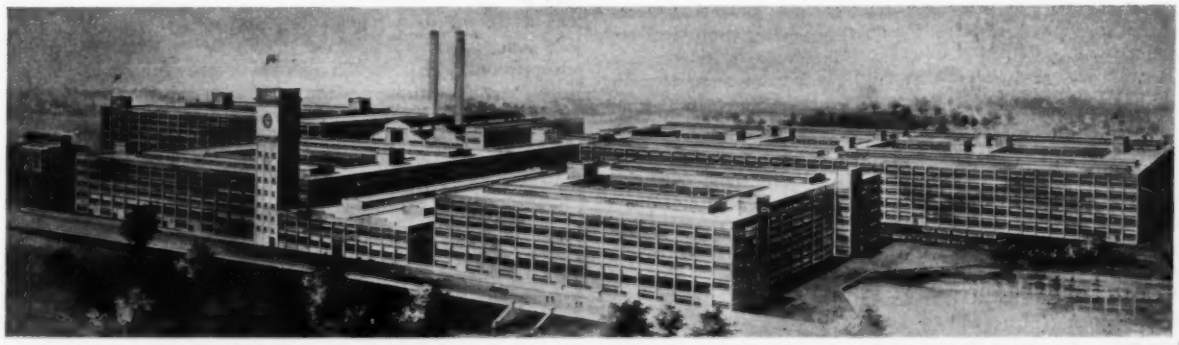


THE GOODYEAR TIRE & RUBBER CO.'S AKRON PLANT NO. 1. MAIN FACTORY WITH GENERAL OFFICES IN CENTER FOREGROUND.

In 1912 the manufacture of rubber clothing was begun and the following year mechanical rubber goods, such as belting, hose, packing, tiling, matting, etc., had become important products. Tire output reached 10,000 daily in 1914, 1,478,396 being sold during the year. Branches discontinued retail business to distribute in wholesale quantities only.

The cushion tire business of the Motz Tire & Rubber Co. of Akron, 50 per cent of whose stock was owned by the Goodyear company, was taken over in 1915 and operated as a department of the latter company. Hose production that year reached 1,000,000 feet for one month, and pneumatic tires up to 48 by 12 for 5-ton trucks were being made. Balloon manufacture was begun, and after 1916 the company took a prominent place among the producers of both the kite and dirigible types for use in the war. Daily tire capacity was increased to 15,000 and later to 20,000, the total output being more than 3,000,000 in 1916. Rim output also increased rapidly. At present the company has about 20 per cent of the automobile tire business of the country, and normally produces 80,000 fiber soles a day. It has 72 branches in the United States, and branches or agencies in most important cities of the world.

Ever since its organization the company has been engaged in an almost constant program of plant extension to take care of increasing business. Factory additions were made in 1901, 1902, 1905, 1908 and 1911, when the plant with its increased factory, warehouse, office and laboratory facilities covered a ground area of 31 acres, had a floor space of 1,000,000 square feet and a power plant of 7,500 horse-power. Four new factory buildings comprising 10 acres of floor space were erected in 1915, and the following year factory, warehouse, office, garage, restaurant and reclaiming plant additions approximated 1,125,000 square feet, including a power plant of 12,000 horse-power. Last year a rim plant 660 by 250 feet was erected, employing 500 workmen. The plant now stands on 150 acres of land, has a combined floor space of about 90 acres and normally employs over 20,000 persons.



THE GOODYEAR TIRE & RUBBER CO.'S AKRON PLANT NO. 2. OUTPUT PRINCIPALLY MECHANICAL GOODS AND SMALL-SIZED TIRES.

Realizing the importance of raw material supply and costs, the company in 1913 acquired control of the Killingly Manufacturing Co. at Killingly, now Goodyear, Connecticut, equipped the plant with new machinery and began the weaving of tire fabric, of which it was using some 8,000,000 yards annually. In 1917 this company was reorganized under the name of the Goodyear Cotton Mills with $5,000,000 capital. A new yarn mill and tenement houses

were erected, increasing the capacity to 100,000 pounds of tire yarn per week. A motor truck express service operating on giant pneumatic cord tires was established between these mills, the Akron factory and Boston branch, which has demonstrated the practicability of this type of tire and haulage and materially assisted in improving tire and truck design and construction.

Meanwhile in 1916, some 10,000 acres of land were purchased in the Salt River Valley at what is now Litchfield, Arizona, the Southwestern Cotton Co. was organized and cotton raising was begun on a large scale in order to ensure a fixed supply of the long-staple Egyptian variety. The area had increased to 14,000 acres in 1919. Rubber growing was also undertaken and in 1919 the company had a 20,000-acre rubber plantation well under way in Sumatra, half of it planted, 125 miles of good roads constructed and 7,000 to 8,000 laborers employed.

With a cotton supply in the Southwest, much crude rubber coming through Pacific ports and a large business on the Coast, construction was begun in 1919 on a $4,000,000 rubber manufacturing plant and a $1,500,000 cotton mill in Ascot Park, Los Angeles, California, on a tract of 480 acres offering opportunity for plant expansion and an industrial village and park adjoining. The Goodyear Tire & Rubber Co. of California was incorporated and capitalized at $20,000,000 and the Pacific Cotton Mills Co. at $5,000,000. Plans were for a capacity of 7,500 tires daily, or an annual business of $15,000,000, employing 1,500 operatives; and a cotton mill of 33,000 spindles having a capacity of 75,000 pounds each of cord and woven fabric, or an annual business of $7,500,000, employing 1,200 operatives. This tire plant began operation in June, 1920.

Among the more important construction projects contributory to the industrial expansion of the company may be mentioned the erection of hundreds of homes beginning in 1913, to be sold at cost to employes on easy payments on a 500-acre tract known as Goodyear Heights, Akron, which was improved with streets, parks, schools, churches, public utilities. In 1919 Goodyear Hall, a $2,500,000 five-story club house 400 by 170 feet was erected opposite the Akron plant to provide such club features as gymnasium, bowling alleys, showers, rest, reading, study, and class rooms, restaurant, theatre, and to house the Goodyear Industrial Republic House and Senate and Goodyear Industrial University with its 600 students and faculty of 117.

To conserve cash reserves, the quarterly dividend on Goodyear common was passed in November, 1920, for the first time in 22 years. It had paid 12 per cent until the last meeting, when the rate was reduced to 10 per cent. In December the credit demands of the company necessitated borrowing $18,825,000 and it became apparent that only a reorganization could avoid bankruptcy. Refinancing was necessitated by the fact that the annual budget was made up to meet a production of $250,000,000 worth of goods, and when general business depression came the company was caught with unduly large inventories of finished products, raw materials and future commitments at high prices.

The meeting of the stockholders at which the final approval of the refinancing plans will be asked continues to be postponed. The reason given by officials of the company is that more time is needed for the working out of the details of the plan with the bankers and merchant creditors. At every postponement, however, it is announced that progress is being made toward clearing up the Goodyear situation which is of vital importance to the rubber industry at large.

The officers of the Arch Narrow Fabric Co., Auburn, Rhode Island, manufacturers of elastic braids, are: Archibald E. Lewine, president; Alvin T. Sapinsley, secretary-treasurer; and Milton C. Sapinsley vice-president. The company purchased its present plant in May, 1920, from the Triple A. Narrow Fabric Co.

IN DEFENSE OF THE CARBON BLACK INDUSTRY

A vigorous protest against state legislation for the prohibition or serious curtailment of the carbon black industry is made by the Natural Gas Products Association, an organization representing the producers of carbon black in Virginia, Kentucky, Louisiana, Montana, and Wyoming. The Association says that carbon black has been made from natural gas for forty years, and that the factories, wells, pipe-lines, and gasoline-extracting plants represent an investment of over $25,000,000; and that not only is employment given by its members to a large number of people, but that the product is one of a most essential character. Carbon black, it is explained, has long been as indispensable (for printers' ink) as wood pulp is in the production of material for the nation's newspapers and other printed matter. So, too, is it of great value in the production of paint, varnish, cement colorings, stove polish, crayons, waterproof coverings, composition goods, carbon paper, typewriter ribbons, etc.

But is is in the making of solid and pneumatic tires and other rubber goods that the intrinsic merit and commercial importance of carbon black have been most strikingly demonstrated. In the making of a considerable part of the better class of the 35,000,000 tires produced in the United States last year, and worth some $800,000,000, carbon black, as A. F. Kitchel, assistant secretary of the Association points out, was used to impart greater toughness and resiliency, to retard oxidation and hence lengthen tire life, while lessening weight, and adding much to tire efficiency.

The companies producing carbon black have been accused of using the natural gas recklessly, and fear is expressed that the entire supply will give out in a few years. Hence it is proposed to forbid the use of the gas for so-called "wasteful" manufacturing purposes and to conserve it and distribute it for domestic needs solely. The carbon black makers deny that they are wasteful, as they extract every bit of available gasoline from the gas before burning the residue for the impalpable carbon, and in that way they add several million gallons yearly to the nation's gasoline supply, a measure of true conservation. Chemists and engineers are constantly at work for the members devising better means for utilizing natural gas and for conserving at the same time the product on which their business vitally depends. The real wastage, they say, can be blamed on oil and gas concerns that are allowing natural gas to escape at the rate of 150,000,000 cubic feet a day, and doing nobody any good.

Is not the true principle that of equal opportunity and open competition, which it has long been the American policy to foster and encourage? The old fable of the body and its members has not ceased to be true. In the laudable desire to save natural gas in certain localities, we must not forget the welfare or convenience of the body politic as a whole. A saving would be too dearly bought if accomplished only at the inconvenience and detriment of the entire public, and the rubber industry in particular.

RUBBER TRADE OF PERU FOR 1919

The foreign trade of Peru for the calendar year 1919, according to statistics recently made available, reached an unprecedented total. Exports of india rubber totalled 3,232,211 pounds, valued at 473,950 Peruvian pounds or 11,531,678 Panamericanos. The Peruvian pound is worth nominally $4.8665 and the Panamericano, a proposed international money of account, is equal to one-fifth of a dollar. Imports of rubber manufactures into Peru were valued at 94,106 Peruvian pounds or 2,289,693 Panamericanos. The quantity of rubber manufactures exported totalled 154 pounds, valued 139 Peruvian pounds or 3,382 Panamericanos.

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News of the American Rubber Industry

ANNUAL REPORT OF THE B. F. GOODRICH CO.

NET SALES for the fiscal year ended December 31, 1920, were $150,007,345 as compared with $141,343,419 for the previous year. Net profits, after allowances for depreciation, interest and exchange losses, but before Federal taxes, were only $921,248 against $17,304,813 the previous year. After payment of dividends on the preferred and common stock there was a deficit of $5,371,792 as compared with a surplus of $12,657,813 after dividends in 1919. This deficit, together with the 1919 Federal taxes, cost of notes, pension fund, exchange losses and transfer of $8,000,000 to reserve, aggregating $21,253,608, were charged against the profit and loss surplus of previous years, thereby reducing that amount from $41,203,046 on December 31, 1919, to $22,706,498. The reserve for contingencies totals $10,000,000 to provide for anticipated losses on raw material commitments for future delivery and covers the difference between commitment prices and prices of corresponding materials in the inventory, which approach the nominal market quotations on December 31, 1920.

The balance sheet shows current assets of $97,481,559, of which $72,631,057 represents raw materials, partly manufactured and finished stock; accounts receivable, $20,172,177; cash, $3,058,314. Current liabilities total $33,164,523, of which $29,122,955 represents bills payable. Total assets and liabilities are $138,910,112.

The income accounts for the years 1919 and 1920 are as follows:

	1920	1919
Net sales	$150,007,345	$141,343,419
Manufacturing expenses, etc.	142,250,719	121,579,265
Balance	7,756,626	19,764,154
Other income	976,346	576,060
Total income	8,732,972	20,340,214
Depreciation	1,937,759	1,835,540
Interest, etc.	4,081,926	1,199,861
Net profits	[1]2,711,286	[2]17,304,813
Previous surplus	41,203,046	33,894,923
Stock profits	45,775	.....
Premium and accrued dividends	.....	387,000
Preferred dividends	2,688,840	2,247,000
Common dividends	3,604,200	2,400,000
Federal taxes	[3]3,057,627	[4]5,558,912
Pension fund, etc.	100,000	177,778
Cost of notes	2,012,903	.....
Exchange loss	1,790,037	.....
Reserve for commitment losses	8,000,000	.....
Profit and loss surplus	22,706,498	41,203,046

[1]Before Federal taxes and deduction of exchange loss.
[2]Before Federal taxes.
[3]For 1919.
[4]For 1918.

The directors regard the report as satisfactory, considering the depression in the rubber industry during the last half of 1920, and the financial position of the company excellent. Subject to the approval of the stockholders, they have voted to retire 11,880 shares of treasury preferred stock. The plants of the company are in efficient working condition, and no further expenditures for additional expansion of fixed properties will be necessary during the current year.

GOODRICH DIVIDENDS

At the directors' meeting held January 19, 1921, a dividend of 3½ per cent was declared on preferred stock, 1¾ per cent payable April 1, 1921, to the preferred stockholders of record at the close of business March 22, 1921, and 1¾ per cent payable July 1, 1921, to the preferred stockholders of record at the close of business June 21, 1921.

FISK RUBBER REPORT

The Fisk Rubber Co. reports for 1920 a surplus, after inventory adjustment and Federal taxes, of $2,130,133, or $1.68 a share earned on its common stock of $25 par value after preferred dividends. In 1919 its earnings amounted to $3,994,657, or $5.99 a share on its common stock then outstanding. Its net profits in 1920 were $5,034,950 and inventory adjustment, $2,669,117.

The company's 1920 Federal taxes requirements were $235,700; its preferred dividends, $1,086,981, and its common dividends, $1,474,758, leaving a deficit of $431,606 at the close of that year.

MILLER PASSES PREFERRED DIVIDEND

The Miller Rubber Co. has issued notices to all preferred stockholders that the preferred stock dividends payment has been passed by order of the board of directors. This is the first time in its history that the Miller company has passed or deferred payment of a preferred dividend.

ANNUAL STATEMENT OF THE LEE TIRE & RUBBER CO.

The Lee Tire & Rubber Co., for the year ended December 31, 1920, reports net profits, after all charges and federal taxes, of $326,638, equal to $2.11 a share on 150,000 shares of common stock of no par value, against $471,805, or $3.14 a share in 1919. The consolidated income accounts for the past two years follow:

	1920	1919
Net sales	$6,705,930	$5,583,993
Cost of goods	6,404,896	4,999,949
Operating profits	301,034	584,044
Other income	116,058	59,332
Total income	417,092	643,376
Federal taxes, interest, etc.	90,054	171,571
Net profits	326,638	471,805
Dividends	225,000	.....
Surplus	101,638	471,805

The plant at Conshohocken, Pennsylvania, is now operating at 50 per cent capacity with orders holding up well. The company sold all its high-priced rubber and fabric last August and is now in position to take advantage of present low prices.

STATEMENT OF THE HOOD RUBBER CO.

The sales of the Hood Rubber Co., and of the Hood Rubber Products Co., Watertown, Massachusetts, for the year ended December 31, 1920, amounted to $32,867,000 compared with $25,444,016 in 1919. Tire sales were $8,700,000 in 1920 as compared with $6,500,000 in 1919. Earnings were gratifying to the stockholders. Inventory merchandise values have been marked down liberally and the balance sheet shows a surplus of $1,934,143, subject to a reserve for federal taxes, after deducting a stock dividend of $2,000,000 from the surplus of December 31, 1919, which was $2,863,953. Regular quarterly dividends of 7 per cent per annum were paid on the preferred stock of both companies, while common stockholders have received during the year dividends of $14 per share on their stock of January 1, 1920. Preferred stock amounting to $150,000 was retired. Total assets and liabilities have increased from $16,067,081 in 1919 to $23,104,606 in 1920.

STATEMENT OF THE AJAX RUBBER CO., INC.

The annual report of the Ajax Rubber Co., Inc., New York City, for the year ended December 31, 1920, shows a loss of $177,920, after depreciation charges, against a net profit of $2,201,267 for 1919. Sales for 1920 amounted to $18,639,866.

The balance sheet shows inventories of $7,408,967; notes and accounts receivable of $3,959,947; cash, $301,990, and deferred charges of $336,205. Total assets and liabilities are $18,376,853. The liabilities include $6,145,000 in notes payable, and $528,292. Deductions for $1,100,000 dividends paid, provisions for 1919 taxes, and the loss for the year 1920 has reduced the surplus from $2,128,848, as of January 1, 1920, to $1,615,480. Future commitments for future deliveries of raw materials amount to only $220,000 for rubber and $1,767,000 for fabric.

The directors have passed the quarterly dividend of 1 per cent on common stock. Three months ago it was reduced from 1½ to

1 per cent, the highest rate having been paid since August, 1917.

At the annual meeting the retiring directors were re-elected, with the exception of Harold W. Stimpson, who declined re-election, Benjamin Briscoe being elected in his place.

ANNUAL REPORT OF THE KELLY-SPRINGFIELD TIRE CO.

Gross profits of $7,721,901 are shown in the annual report of the Kelly-Springfield Tire Co., New York City, for the year ended December 31, 1920, against $7,034,284 the previous year. Net profits were $3,430,914, against $3,257,549. Deductions totaling $2,076,152, which included $500,000 for fluctuations in inventory valuations as well as for losses on Liberty bonds and fixed and misceilaneous charges, left a net income of $1,959,293 before providing for Federal taxes. Cash and stock dividends on preferred and common stock amounting to $2,230,606 reduced the total surplus from $8,120,453, as of December 31, 1919, to $7,203,915.

The balance sheet shows cash, $2,182,089; accounts receivable, $2,100,358; notes receivable, $114,419; merchandise and material inventories, $9,751,388; accounts payable, $217,412; notes payable, $8,155,000; total assets and liabilities, $36,293,942. The company has no supplies or future commitments of raw materials at former high prices.

FINANCIAL NOTES

At the meeting of the board of directors of the Firestone Tire & Rubber Co., Akron, Ohio, held March 10, 1921, the quarterly dividend on the 6 per cent and 7 per cent preferred stock was declared, but no dividend was declared on the common stock, though there is approximately $33,000,000 surplus, and cash in the banks of more than $77,500,000, thus conserving cash resources and enabling the company to increase production and replenish the stocks of finished tires depleted during the past eight months. Sales are increasing, and March business is estimated in excess of $6,000,000. There is even predicted a possibility of a tire shortage later in the year. It is believed for the next quarter the resumption of the dividend on the common stock will be justified, as sales and administrative expenses have been reduced more than 60 per cent, and with lower labor costs there is a firmer foundation for increased production and sales, which should result in increased earnings.

The Delion Tire & Rubber Co., Baltimore, Maryland, successor to the company of the same name originally formed in New Jersey, has utilized the proceeds from the sale of its 8 per cent cumulative preferred stock in the purchase and equipment of its factory at Baltimore. The capitalization of this company is as follows: preferred stock (par $10) authorized $600,000, presently to be issued $600,000; and common stock (no par value) authorized 100,000 shares, presently to be issued 100,000 shares. Subscribers to the preferred stock have the privilege of subscribing for the common stock at $5 per share, subject to allotment, to the extent of 60 per cent of their preferred stock subscription. The directors of the company are: C. B. Buchanan, W. T. Tillar, W. H. Trolinger, W. H. Price, Jr., John E. Semmes, Jr., John W. Price, Robert B. Arnold, W. C. Price, Walter M. Ballard and J. I. Berinstein.

Stockholders of Ames Holden McCready Limited, Montreal, Canada, have authorized the issue of $2,000,000 seven per cent 10-year second refunding mortgage bonds.

NEW YORK STOCK EXCHANGE QUOTATIONS

MARCH 26, 1921

	High	Low	Last
Ajax Rubber Co., Inc.	....	....	34
The Fisk Rubber Co.	16¼	15⅞	16⅛
The B. F. Goodrich Co.	38⅛	37¼	38
The B. F. Goodrich Co., pfd.	....	....	....
Kelly-Springfield Tire Co.	41	39⅛	39½
Kelly-Springfield Tire Co., pfd.	....	....	87
Keystone T. & R. Co.	16⅛	16	16
Lee R. & T. Corp.	28½	28	28
United States Rubber Co.	73⅛	72	73⅛
United States Rubber Co., 1st pfd.	....	....	102

DIVIDENDS DECLARED

Company	Stock	Rate		Payable	Stock of Record
American Chicle Co., Inc.	Pfd.	1½ %	q.	Apr. 1	Mar. 19
Boston Woven Hose & Rubber Co.	Com.	$3.00	q.	Mar. 1	Mar. 15
Brunswick-Balke-Collender Co.	Pfd.	1¾ %	q.	Apr. 1	Mar. 20
Canadian Consolidated Rubber Co., Limited	Pfd.	1¾ %	q.	Mar. 31	Mar. 24
Canadian General Electric Co., Ltd.	Com.	2%	q.	Apr. 1	Mar. 15
Canadian General Electric Co., Ltd.	Pfd.	3½ %	s.a.	Apr. 1	Mar. 15
Canadian Westinghouse Electric & Manufacturing Co., Limited	Com.	2%	q.	Apr. 1	Mar. 21
Dayton Rubber Manufacturing Co.	Pfd.	1¾ %	q.	Apr. 1	Mar. 15
Driver-Harris Co.	Pfd.	1¾ %	q.	Apr. 1	Mar. 26
du Pont de Nemours, E. I. & Co., Inc.	Com.	2%	q.	Mar. 15	Feb. 28
du Pont de Nemours, E. I. & Co., Inc.	Deb.	1½ %	q.	Apr. 25	Apr. 10
Firestone Tire & Rubber Co.	6% Pfd.	1½ %	q.	Apr. 15	Apr. 1
Firestone Tire & Rubber Co.	7% Pfd.	1¾ %	q.	May 15	May 1
Fisk Rubber Co., The	2d Pfd.	1¾ %	q.	Mar. 15	Feb. 28
General Electric Co.	Com.	$2.00	q.	Apr. 15	Mar. 9
General Tire & Rubber Co., The	Pfd.	1¾ %	q.	Apr. 1 July 1	Mar. 22 June 21
Hood Rubber Products Co., Inc.	Pfd.	1¾ %	q.	Mar. 1	Feb. 21
Kelly-Springfield Tire Co.	6% Pfd.	$1.50	q.	Apr. 1	Mar. 15
Mason Tire & Rubber Co., The	Pfd.	Reg.	q.	Apr. 1	...
United Shoe Machinery Co.	Com.	$0.50	q.	Apr. 5	Mar. 21
United Shoe Machinery Co.	Pfd.	$0.37½	q.	Apr. 5	Mar. 21
Westinghouse Electric & Mfg. Co.	Com.	2%	q.	Apr. 30	Mar. 31
Westinghouse Electric & Mfg. Co.	Pfd.	2%	q.	Apr. 15	Mar. 31
Wilson Rubber Co.	Com.	10%	an.	...	...

AKRON RUBBER STOCK QUOTATIONS

The following are closing quotations of March 23, supplied by The App-Hillman Co., Second National Building, Akron, Ohio:

	Bid	Asked
American R. & T. Co., com.	40	50
Amazon Rubber Co., The	20	30
Firestone T. & R., com.	75	78
Firestone T. & R., 6% pfd.	83	84
Firestone T. & R., 7% pfd.	73	75
General T. & R. Co., The, com.	180	205
General T. & R. Co., The, 7% pfd.	75	85
Goodrich, B. F., The, com.	39	39⅛
Goodrich, B. F., The, pfd.	73	76
Goodrich, B. F., The, 5-yr. 7% notes	89	90
Goodyear T. & R. Co., The, com.	13¼	14
Goodyear T. & R., Co., The, 7% pfd.	32½	33
India T. & R. Co., com.	100	130
India T. & R. Co., 7% pfd.	..	80
Mason T. & R. Co., The, com.	15	16
Mason T. & R. Co., The, 7% pfd.	64	66
Marathon T. & R. Co., com.	3	4
Miller Rubber Co., The, com.	65	70
Miller Rubber Co., The, 8% pfd.	68	70
Mohawk Rubber Co., The	125	135
Phoenix Rubber Co., com.	..	18
Phoenix Rubber Co., pfd.	..	88
Portage Rubber Co., The, com.	18	20
Portage Rubber Co., The, 7% pfd.	..	35
Republic Rubber, com.	¾	1
Republic Rubber, 7% pfd.	..	20
Republic Rubber, 8% pfd.	8	10
Rubber Products Co., The	..	100
Standard Tire Co., com.	..	100
Standard Tire Co., pfd.	..	90
Star Rubber Co., com.	..	100
Star Rubber Co., 8% pfd.	..	100
Swinehart T. & R., com.	30	40
Swinehart T. & R., 7% pfd.	..	70

VALVE FOR TOY BALLOONS

The newest valve for toy balloons is so constructed that it does not cut the balloon. The inside of the neck is concaved in order to accomplish this and the demand for this valve leads the manufacturers to believe that this is one of the outstanding features. During the last three months it has been necessary to triple production to meet the growing demand for this particular balloon valve. The interior construction of the valve, which is covered by patents, is shown in the accompanying illustration in cross-section.—The Anchor Rubber Co., Inc., Barberton, Ohio.

ANCHOR VALVE FOR TOY BALLOONS

NEW INCORPORATIONS

Allsteel Ridewell Tire & Rubber Co., The, November 5, 1920 (Ohio), $250,000. A. Huetter, president and general manager; H. Knapp, secretary and treasurer. Principal office, 513-519 Lindsey Building, Dayton, Ohio. To manufacture Huetter metallic steam bags.

Atlantic Rubber Ace Co., March 1, 1921 (New Jersey), $100,000. C. M. Haight, New Market; C. Sebolt; Louis J. and Edward L. Belloff, all of New Brunswick—both in New Jersey. Principal office, National Bank of New Jersey Building, 390 George street, Rooms 410-411-413, New Brunswick, New Jersey. Agent in charge, C. Sebolt. To manufacture, buy, sell, and deal in tires, tubes, etc.

Atlas Rubber Co., January 14, 1921 (West Virginia), $25,000. E. A. Jordan; C. L. Hibner; E. F., M. M. and H. M. Hartley—all of Huntington, West Virginia. Principal office, Huntington, West Virginia. To buy and sell rubber goods, supplies, etc.

Barbanell Trading Corp., March 15, 1921 (New York), $15,000. E. Light, 68 West 113th street; M. Erenstoft, 65 Lenox avenue—both in New York City; M. E. Graef, 68 Winfield avenue, Jersey City, New Jersey. To deal in crude rubber.

Bickett Rubber Products Corp., January 31, 1921 (Wisconsin), $100,000. M. G. Kusel, president; L. M. Bickett, vice-president; O. C. Wertheimer, secretary and treasurer. Principal office, 600 South First street, Watertown, Wisconsin. To manufacture and sell rubber products of every nature.

Brazilian Rubber Co., The, January 12, 1921 (Virginia), $50,000. W. Y. Hosier; C. Randolph and George W. Gilbert—all of Norfolk, Virginia. Principal office, Norfolk, Virginia. To conduct a brokerage, commission and mercantile business in products and merchandise of all kinds.

Brazilian Rubber Refining & Mfg. Co., Inc., March 10, 1921 (New York), $400,000. J. E. Strowbridge, 812 Bergen street, Brooklyn, New York; J. T. Coggins, Plainfield, New Jersey; F. Chamie, Rua St. Antonio, 39, Pará, Brazil, South America. To manufacture rubber products.

Clark Rubber Co., February 8, 1921 (Massachusetts), $100,000. L. B. Conant, Cambridge; M. C. Clark, Emmons street; H. L. Metcalfe, West Central street, both of Franklin—both in Massachusetts. Principal office, Franklin, Massachusetts. To buy, sell and manufacture rubber goods.

Cotter Tire & Rubber Co., March 9, 1921 (Delaware), $500,000. T. L. Croteau; M. A. Bruce; S. E. Dill—all of Wilmington, Delaware. To manufacture and sell rubber tires.

Crude Rubber Examiners Co., Inc., March 9, 1921 (New York), $1,000. E. Lacey; W. Fagan, both of 60 Park avenue; C. H. Jenkins, 1491 Westchester avenue, Pronx—both in New York City. To examine crude rubber.

Fulton Tire Corp., February 16, 1921 (Massachusetts), $50,000. Joseph Prince, 146 Coolidge street; Jacob Prince, 122 Pleasant street, both of Brookline; L. J. Blank, 20 Merrimac street, Boston—both in Massachusetts. Principal office, Boston, Massachusetts. To deal in tires, automobile accessories, etc.

Gold Medal Rubber Co., Inc., March 15, 1921 (New York), $25,000. S. and A. Newman; G. J. Bates—all of 1934 Broadway, New York City. To deal in tires, etc.

Gotham Tire Co., Inc., March 10, 1921 (New York), $10,000. L. and J. Weiss, both of 215 Audubon avenue; M. Hillman, 255 West 55th street—both in New York City. To deal in tires.

Jamestown Tire Service Corporation, March 11, 1921 (New York), $25,000. M. H. and N. L. Kent, both of R. F. D. 77; H. W. Burgeson, 72 Sturgis street, both of Jamestown, New York. Principal office, Jamestown, New York.

National Rubber Goods Manufacturing Co., March 12, 1921 (Delaware), $2,000,000. R. A. Stillwell, Akron; W. H. Hill; B. Williamson, both in Cleveland—both in Ohio. To manufacture products from rubber.

New York Kelly Springfield Motor Corporation, March 15, 1921 (New York), $200,000. E. Hunn, Jr.; G. S. Hauck, both of 70th street and East River, New York City; A. C. Hare, 300 Walnut street, Philadelphia, Pennsylvania. To deal in tires, etc.

Parker Rubber Manufacturing Co., February 17, 1921 (Massachusetts), $125,000. D. H. Finberg, president; P. Finberg, vice-president; H. D. Finberg, treasurer; J. T. Dunn, clerk; M. Finberg, director—all of 621 Albany street, Boston, Massachusetts. Principal office, Boston, Massachusetts. To manufacture and deal in rubber products.

Prince Reenforced Rubber Co., The, March 1, 1921 (Massachusetts), $50,000. H. P. Knox, president; H. B. Morse, treasurer and clerk; J. D. Prince, director—all of 140 Oliver street, Boston, Massachusetts. Principal office, Boston, Massachusetts. To manufacture and deal in rubber, tires, tubes, etc.

Resistance Tire & Rubber Co., February 25, 1921 (New York), $250,000. D. F. O'Meara; W. Troy, both of 60 Broadway; F. G. W. Campbell, 22 Broad street—both in New York City. To manufacture tires, etc.

Union Rubber Co., Inc., March 3, 1921 (Massachusetts), $100,000. R. D. Smith, president; J. W. Worthen, secretary and treasurer; M. E. Buchanan, clerk—all of 55 Congress street, Boston, Massachusetts. Principal office, Boston, Massachusetts. To manufacture and deal in boots, shoes, rubbers, etc.

United Rubber Co., February 5, 1921 (Washington), $100,000. C. G. and P. L. Austin; W. W. Powers; A. Fulrath; J. T. Casey. Principal office, 632 New York Building, Seattle, Washington. To manufacture, sell and deal in rubber goods.

United States Armorcord Tube Co., January 17, 1921 (West Virginia), $50,000. W. A. Ream; E. D. Tumlin; J. H. McDermott; L. E. McWhorter, Jr.—all of Morgantown, West Virginia; H. M. Ream, Mansfield, Ohio. Principal office, Morgantown, West Virginia. To buy and sell tubes, etc.

ROCHESTER MEETING OF THE AMERICAN CHEMICAL SOCIETY

The spring meeting of the American Chemical Society will be held at Rochester, New York, April 26-29, 1921. An interesting and important program has been planned and a large and successful meeting is assured. Two days, April 27 and 28, have been allotted to the divisional meetings.

The secretary of the Rubber Division will send its members, prior to the meeting, a draft of tentative specifications for the analysis of rubber goods in order that each member may be prepared to discuss this subject, which will be the main order of business for the first day. The second day will be devoted to the presentation of an interesting series of papers on chemistry and research in the rubber industry.

PERSONAL MENTION

Charles B. Whittelsey, president of the Hartford Rubber Works Co., a subsidiary of the United States Rubber Co., has been re-elected treasurer of The Society of Automotive Engineers.

Mr. Whittelsey was elected to membership in the society in 1910 and became a life member in 1916. He was a member of the Standards Committee for several years, beginning in 1911, and served as chairman of the Tire and Rim Division in 1918 and 1919. Mr. Whittelsey was a member of the council in 1912 and 1913, was elected treasurer in 1918 and has been reelected each year since.

D. Stewart Iglehart, vice-president of W. R. Grace & Co., New York, import, export and banking, recently returned on a Grace line steamship from a business trip of several months on the west coast of South America.

A. B. Jones, formerly vice-president of The B. F. Goodrich Co., has been elected president of the Kelly-Springfield Tire Co., in place of F. A. Seaman, who temporarily acted as president, and who has been elected first vice-president.

Ernest Schulthess, who is well known in the mechanical rubber goods trades of the New York metropolitan district, and formerly with the Gutta Percha & Rubber Manufacturing Co., 126-128 Duane street, New York, is now general manager of the Atlas Rubber Co., 26 Cortlandt street, New York.

C. J. Welch, assistant general sales manager of the United States Rubber Co., 1790 Broadway, New York, has been elected director of that company.

F. H. Lyon, formerly manager of the crude rubber department of the Pacific Trading Corporation of America, 90 West street, New York, is now associated with Roger S. Hardy, crude rubber broker, 82 Beaver street, New York.

James C. Griven, who has been connected with the rubber business since 1909, as Philadelphia salesman and branch manager, Richmond branch manager and Pittsburgh district manager, has recently joined the forces of The Miller Rubber Co., of Akron, Ohio, as special eastern representative, with headquarters in New York City.

E. B. Tozier has resigned as president and general manager of the Polack Tyre & Rubber Co., that company having been absorbed by The Buckeye Rubber Products Co., Willoughby, Ohio. Mr. Tozier has not yet announced his future movements. His headquarters will be at the Buckeye office, 527 West 23rd street, New York.

Victor W. Fink established an office on March 1, as a dealer in crude rubber at 24 Stone street, New York.

Guy M. Sherriff, who has been appointed district sales manager of the Automatic Safety Tire Valve Corporation, New York, was formerly connected with the Lynn, Massachusetts, plant of the General Electric Co. for some time, and during the war with the Wright-Martin Aircraft Corporation, going from them direct to the Automatic Safety Tire Valve Corporation as assistant sales manager, having special inside duties.

Business acquaintances of Irving Laurie, secretary and treasurer of the Somerset Rubber Reclaiming Works, New Brunswick, New Jersey, will be interested to hear of his marriage to Miss Blanche Susskind at the Hotel Savoy, New York City, February 8, 1921. Mr. Laurie entered the employ of the Somerset Rubber Reclaiming Works, of which his father, Irving Laurie, senior, is president, in 1913. In January, 1920, father and son purchased the entire outstanding stock of the company, each controlling fifty per cent of the stock.

A LEADER IN TIRE FABRIC MANUFACTURE

ROBERT J. CALDWELL, manufacturer, capitalist and publicist, was born in Louisville, Kentucky, May 12, 1875. Following his graduation from the Polytechnic Collegiate Institute, Brooklyn, New York, he engaged in business as a commission merchant, organizing and assuming the presidency of the R. J. Caldwell Co., Inc., New York City, which markets the output of several large cotton fabric mills.

R. J. CALDWELL

Mr. Caldwell soon became one of the best known and most successful operators in tire fabrics, later engaging also in their manufacture. He gained control of various weaving and spinning mills in the United States and Canada and enlarged and developed them for this highly specialized product. Chief among them are the Connecticut Mills Co., Danielson, Connecticut, where a model industrial village was erected with excellent community features, and the Taunton Cotton Mills, a spinning plant at Taunton, Massachusetts.

The broad scope of his activities in this direction is indicated by the fact that he is at present chairman of the Connecticut Mills Co.; Taunton Cotton Manufacturing Co.; Canadian Connecticut Cotton Mills, Limited, Sherbrooke, Canada; Knitted Padding Co., Canton, Massachusetts; and R. J. Caldwell, Limited, and The Globe Mills, Fall River, Massachusetts. He is also a director of the Salt River Valley Cotton Co., Nobska Spinning Co., Connecticut Cotton Co. and Seaboard National Bank.

Ever a student of the mutual problems and responsibilities of capital and labor, Mr. Caldwell has found opportunity to utilize his wide practical experience to good purpose as chairman of the sub-committee on industrial relations of the National Republican Advisory Committee on Policies and Platform, and as chairman of the industrial relations committee of the National Republican Club. In 1919 he was appointed a member of the United States Industrial and Economic Commission to make a survey of the industrial situation in Europe. The following year he was appointed special economic commissioner by the United States Department of Labor, to report on industrial and economic conditions in mid-Europe. He is the author of "Industrial Democracy," "Proceedings, Academy of Political Science, 1916," and various reports and articles on industrial and labor conditions in Europe and the United States.

Mr. Caldwell was much impressed by the organization of labor abroad to prevent strikes, unemployment and war, and believes that American manufacturers will do well to watch the results being achieved by shop committees participating in factory management under the Whitley system. America, he thinks, must come sooner or later to this conception of industrial democracy.

Mr. Caldwell is president of the American Mid-European Association and a member of the New York Chamber of Commerce, France-America Society, American-Hellenic Society, the Pilgrims and the Academy of Political Science. His clubs include the Bankers' Club of America, Authors' Club of London, Cosmos Club of Washington, Lotos Club, Metropolitan Club, Nassau Country Club, Automobile Club of America, Piping Rock Horse Show Association and the International Sports Club.

THE RUBBER TRADE IN THE EAST AND SOUTH

By Our Regular Correspondent

NEW YORK

AT THE ANNUAL MEETING of the Dunlop Tire & Rubber Corporation of America, held March 15, at 120 Broadway, New York, the following officers and directors were elected:

Officers: F. C. Walcott, president; P. D. Saylor, vice-president, general manager and treasurer; R. J. Dillon, assistant-treasurer; S. S. Walcott, secretary and assistant-treasurer.

Directors: L. M. Bergin, F. C. Walcott, P. D. Saylor, J. Westren, Pierre du Pont, R. W. Pomeroy, George duCros, Sir Harry McGowan.

At the annual meeting of the National Aniline & Chemical Company, Inc., the following directors were elected: William Hamlin Childs, William H. Nichols, William H. Nichols, Jr., and Edward L. Pierce in place of C. S. Lutkins, H. Wigglesworth, T. M. Rianhard, F. M. Peters and W. N. McIlravy. The remainder of the board was reelected.

The Kelly-Springfield Tire Co. with general offices on Seventh avenue at 57th street, New York, announced the election of the following directors at its meeting on March 8: Stephen Peabody, A. L. Scheuer, F. A. Seaman, Gustavus Maas, A. M. Poole, Arthur Sachs, Alfred B. Jones and Theodore G. Smith.

The Cutler-Hammer Manufacturing Co., Milwaukee, Wisconsin, announces that E. N. Lightfoot will assume the title of manager of the heating department with headquarters at the New York works. He will be in full charge of all matters relating to the sale of electric heating devices.

The Miller Rubber Co., Akron, Ohio, announces that owing to the increase in their export business larger offices and storage facilities have been secured for the New York branch. The new address is 121-125 Duane street. The export headquarters remain at the main office.

The American Hard Rubber Co., 11 Mercer street, New York, announces the retirement of Philip H. Campbell as manager of the sundries sales department after forty years' connection, to be succeeded by G. Brette Glaenzer.

Sweeney, Sniffen & Sweeney, crude rubber brokers, have removed their offices to The New Gotham National Bank Building, Columbus Circle and Broadway, New York, where added facilities will enable them to render still more efficient service.

Judge Mayer has appointed former Governor Benjamin B. Odell and former Judge Van Vechten Veeder receivers of Gaston, Williams & Wigmore, importers of crude rubber, exporters and steamship owners, of 100 West 41st street, New York. The bond is $25,000, and they are directed to continue the business. The liabilities exceed $6,000,000. The assets consist mainly of the stock of the company and of twenty-five subsidiaries.

The National Balloon Co. has moved recently from 41 Union Square into larger quarters at 799 Broadway, New York.

The Asbestos & Rubber Works of America has removed its offices from the old Gotham National Bank Building to the eleventh floor of The New Gotham National Bank Building, Broadway and 59th street, New York.

The Climax Compression Tube Co. of New York, Inc., 505 Fifth avenue, New York, is a subsidiary of the Climax Rubber Co., Columbus, Ohio. The factory is located in Buffalo, New York. The executive offices on Fifth avenue are in charge of A. L. Case, chairman of the board of directors. The officers of this company are: Peter A. Miller, president; W. J. Wright, vice-president, and Frank M. Seeger, secretary-treasurer. The factory has been undergoing repairs and alterations preparatory to manufacturing Climax air tight and compression tubes. Early in April it is expected there will be a production of from 500 to

1,000 air tight tubes and in another month at least an equal number of compression tubes.

The Vulcanized Rubber Co. capitalized at $1,500,000 under the laws of Maine, has dissolved its New York incorporation and appointed H. S. Dodd its representative at 251 Fourth avenue, New York.

The Norwalk Tire Sales Co., Albany, New York, has changed its name to Surgenor Auto Supply Co.

The Habershaw Electric Cable Co., New York, has increased its capital from $31,500,000 to $33,000,000.

The Naugatuck Tire & Rubber Co., Manhattan, has increased its capital from $10,000 to $50,000.

Reichard-Coulston, Inc., 303 Fifth avenue, New York City, has been appointed representative of Typke & King, Limited, Surrey, England, manufacturer of chemicals for the rubber trade, including the well-known T & K brands of golden and crimson antimony.

The Palmer Tire Co., 5 Columbus Circle, New York, which formerly manufactured the "Palmer Rebiltright" tire, will erect an addition to its factory at Poughkeepsie, New York, to manufacture Ford size, 30 by 3½ inches, tires and tubes, and will discontinue the rebuilt tire business. C. J. Davis will take entire charge of manufacture of the new product, which will be known as the "Henry" tire and tube. F. D. Palmer will have charge of the Poughkeepsie office and E. K. Dusenbury will handle sales at the New York office, to which the home offices have been moved from Poughkeepsie. The officers of the company are: William Celler, president; Harry J. Fitzpatrick, treasurer; and E. K. Dusenbury, secretary. These, with A. Quinn and Walter Weaver, make up the board of directors.

Franklin Import & Export Co., Inc., crude rubber importer and dealer, has removed from 220 Broadway to 213 Water street, New York.

The Good Luck Tire & Rubber Co., Inc., has changed its name to the Climax Compression Tube Co. of New York, Inc., in order to more closely identify itself with the Climax compression inner tube which it manufactures. Officers are Peter A. Miller, president; H. R. Tucker, vice-president; Frank M. Seeger, secretary and treasurer. The offices of the company are located in the Root Building, 70 West Chippewa street, Buffalo, New York, and branches are maintained in Rochester, Lancaster and Watertown.

PENNSYLVANIA

The Quaker City Rubber Co., Philadelphia, Pennsylvania, announces the election of the following officers: C. A. Daniel, president and treasurer; William F. Metzger, vice-president; and H. R. Shellenberger, secretary and assistant treasurer.

Taylor, Stiles & Co., with general office and factory at Riegelsville, New Jersey, has opened offices at 204 Bailey Building, 1218 Chestnut street, Philadelphia, with Charles T. Stiles as manager and factory representative. The company manufactures scrap rubber, rag, waste paper and thread waste cutters under the "Giant" trade-mark, and also machine knives of all kinds.

Lynskey-Neal-Lynskey, Pittsburgh, Pennsylvania, well-known local tire dealers, were recently appointed by the Syracuse Rubber Co., Inc., Syracuse, New York, to handle "Syra-Cord" tires in the Pittsburgh territory. William H. Neal, manager, reports a bright outlook for the tire business during the coming season.

Charles L. Langholtz has been appointed assistant manager of the export division of the H. H. Robertson Co., Pittsburgh, Pennsylvania.

SOUTHERN NOTES

The Consumers Tire & Supply Co., Inc., Charlotte, North Carolina, advise that they have increased their capital from $100,000 to $1,000,000. If conditions improve, this company expects to open stores, garages and service stations in South Carolina and Florida.

Albert Numbers, who was formerly at the head of the Reliable Tire & Rubber Co., and the National Tire Co., Trenton, New Jersey, has been appointed general manager of the Virginia Rubber Co., at Charleston, West Virginia. The company is a $1,000,000 concern and specializes in automobile tires. It has one of the most modern plants in the country. Mr. Numbers has been associated with the tire industry for many years.

The Ten Broeck Tyre Co., Louisville, Kentucky, recently disposed of its plant and property to the Cumberland Tire & Rubber Co., of the same city. The Cumberland company expects to enlarge the textile mill from its present capacity of about 5,000 spindles to 30,000 spindles sometime during the current year.

The Currie Brothers Co., Inc., Atlanta, Georgia, was recently incorporated to manufacture "Tirometer" heavy touring tubes. J. W. Currie, formerly senior member of the Currie-Akers Tire Co., tire distributers, is president; Peter W. Hutcheson is general manager. The company will establish branch offices in New York, Chicago, Cleveland, Kansas City, Denver and Los Angeles. The "Tirometer" tube is described elsewhere in this issue.

The Davis Carbon Black Co., Charleston, West Virginia, which was incorporated August 31, 1920, is capitalized at $500,000. The incorporators were: O. L. Davis, Alton N. Davis, W. H. Davis, F. R. Hurlbutt, and Lodore Davis.

NATIONAL ASSOCIATION OF WASTE MATERIAL DEALERS

THE ANNUAL MEETING of the National Association of Waste Material Dealers took place at the Hotel Astor, New York, on the 16th of March, preceded on the 14th and 15th by the meetings of the various divisions.

FRANK C. OVERTON

Frank C. Overton, of Castle, Gottheil & Overton, of New York, dealers in paper stock, was unanimously elected president of the Association for the ensuing year, succeeding F. W. Reidenbach.

In his address Mr. Overton made a strong plea for the support of the individual members in maintaining the dignity and advancing the standing of the Association by the addition to its membership of responsible, well-meaning concerns in the waste business. There is no room in the Association for concerns or individuals who do not value the standards of business integrity that the Association advocates.

President Overton summarized the accomplishment of the National Association by saying that it started without any recognized rules of trade, without any standard gradings for material, without any recognition whatever among the mills, but that it has now reached a point where it is recognized by the people from whom it buys, to whom it sells, by the railroads over which it ships and by the steamship lines which bring its merchandise from abroad, and as time goes on its power will increase and more recognition will be given to its legitimate wishes.

SECRETARY'S REPORT

Secretary Charles M. Haskins in his annual report said that "One of the most encouraging accomplishments during the past year has been the high regard in which the organization's credit bureau has come to be held, not only by members, but by financial institutions throughout the country and by consumers."

One of the most recent additions to the organization is that of a Southwestern Division recently formed, with headquarters in St. Louis. This division has already been active in preventing unjust and discriminatory legislation against waste material dealers in that section.

Several proposed changes in the by-laws of the Association were adopted, the most important of which was that permitting waste material merchants in foreign countries to become associate members of the organization. This change was viewed as an expansion of the Foreign Trade Division of the National Association.

SCRAP RUBBER DIVISION

Nat E. Berzen was reelected chairman for the coming year. The meeting was interested particularly in the effect of present high freight rates in the present market. Reclaimed rubber, in order to compete with crude at present prices, must depend on such low-priced scrap that for most collectors it is almost impossible to sell scrap at such levels on account of the high freight rates. It was therefore the sense of the meeting that railroad rates ought to be reduced, and that the Association ought to endeavor to bring them down within reason.

VICE-PRESIDENT, KELLY-SPRINGFIELD TIRE CO.

Frederick A. Seaman, vice-president of the Kelly-Springfield Tire Co., New York City, has for over two decades played an important part in the financial and commercial development of this conspicuously successful firm. Born in New York City in 1862, he received his education at the Swarthmore Preparatory School and Swarthmore College, from which he was graduated in 1883.

On leaving college he became assistant to the receiving teller of the Tradesman's National Bank, and in 1886 secretary to the New York & New Jersey Globe, Gas & Light Co. In 1899 he associated himself with the Kelly-Springfield Tire Co. as secretary and assistant treasurer. The following year he became secretary and treasurer, in 1919 vice-president and secretary, and in 1920 served as president. At the last annual meeting he was elected first vice-president.

Frederick A. Seaman

He is a member of the University Club, Lotus Club, New York Athletic Club, Morris County Golf Club, Stamford Yacht Club, The Rubber Association of America, Motor & Accessory Manufacturers' Association, and the Society of Colonial Wars.

THE RUBBER TRADE IN NEW JERSEY

By Our Regular Correspondent

TRENTON NOTES

The rubber manufacturers of Trenton and vicinity believe that all branches of the business will begin to pick up with the advent of summer, as they can see no reason at this time for a continuation of the slump. John S. Broughton, president of the United & Globe Rubber Manufacturing Co., recently returned from a business trip through the West, and found conditions there very encouraging. He said the western business interests believe that the trade will reach normal in a short time. Other Trenton rubber manufacturers are of the same opinion, but the present time finds all branches of the rubber industry far from normal. The tire situation has begun to pick up, but the mechanical end of the trade is very dull.

One branch of the rubber industry not greatly affected by the readjustment period is the manufacture of rubber heels. Clifford H. Oakley, president of the Essex Rubber Co., Trenton, states that if the rubber heels being produced by the Essex company were piled on top of each other, the height would be about one mile. More than nine tons of rubber heels are being produced daily at the Essex plant.

In order to prevent further annual losses through freshets in the Assanpink Creek, the Empire Tire & Rubber Corporation has asked the Trenton City Commissioners to take immediate action to minimize the danger. When the creek flooded its banks last winter, bringing damage to factories located along the stream, the Empire corporation sustained losses aggregating $240,000, of which amount $90,000 was wages to employes, due to the necessary closing of the plant. The Joseph Stokes Rubber Co., which is also situated along the stream, has likewise suffered severe losses.

The Joseph Stokes Rubber Co. will shortly erect a new storehouse to take the place of the one recently destroyed by fire. The new building will be fireproof.

The New Jersey Rubber Manufacturers' Association recently held its monthly meeting at the Trenton Country Club. After a business meeting a banquet was served. Talks were given by several members, who predicted better business conditions by early summer. John S. Broughton, president of the organization, presided.

Twenty-two students were enrolled in the new department of rubber technology at the Trenton School of Industrial Art, which has just closed for the season. The department proved a big success, the students comprising shopmen, foremen and superintendents from the various Trenton rubber mills. A series of twenty lectures was given by Dr. William F. Zimmerli, chief chemist of the Howe Rubber Corporation, New Brunswick, and formerly assistant professor of chemistry in charge of the course in rubber chemistry at the Municipal University, Akron, Ohio. The lectures were on the history, theory and practice of the rubber industry, and covered all branches of the business. It is planned to broaden this rubber course next season.

Students in the Trenton high school were recently given an idea of how certain kinds of rubber products are manufactured. Edmund W. Craft, purchasing agent of the Thermoid Rubber Co., gave an illustrated lecture on crude rubber before the students and explained the various processes used in the rubber industry.

At its recent annual meeting the Globe Rubber Tire Manufacturing Co., Trenton, elected the following officers: H. W. Kugler, president; R. E. Glass, vice-president; J. V. Iverson,

treasurer, and F. H. Craig, secretary and assistant treasurer.

R. H. Phillips, who resigned as sales manager of the automobile accessories and mechanical goods department of the Essex Rubber Co., has been elected secretary and treasurer of the National Tire Co., and the Reliable Tire & Rubber Co., Trenton, succeeding Albert Numbers. Mr. Phillips had been connected with the Essex company for more than twelve years.

MISCELLANEOUS NEW JERSEY NOTES

Samuel Dintenfass, trading as the Universal Tire & Rubber Co., Philadelphia, Pennsylvania, has instituted suit in the United States District Court at Trenton against the Combination Rubber Manufacturing Co., of Bloomfield, for alleged failure to live up to an agreement in the manufacture of tires for the complainant, it being alleged that they were not up to the standard. The Combination company claims that it gave no guarantee with the tires and that they were made according to the regular formulas, also that it gives no guarantee with any of its products.

The Goodyear Tire & Rubber Co., of Akron, Ohio, recently obtained a judgment against Harry Kruvant, of Newark, in a court at that place. The judgment was for $2,836.19. Kruvant, it was claimed, promised to be responsible for the bills of Louis Siegler and Albert J. Siegler, officers of the now bankrupt Ever Ready Auto Supply Co., if the Goodyear company would extend the Sieglers credit. Credit was extended to the amount sued for, but the Sieglers did not pay.

Whitall Tatum Co., New York, has just completed the transfer of its New York assembling department to the rubber works at Keyport, New Jersey, where it will occupy a portion of the three-story addition just completed. The company is also building an experimental machine shop at its glass plant at Millville, New Jersey.

The plant of the Ewing Rubber Co., recently purchased from Archibald F. Updike, and situated in Ewing township, on the outskirts of Trenton, was destroyed by fire on March 16, resulting in a loss of several thousand dollars. All the finished stock and the big supply of crude rubber was destroyed, together with the office effects. The company manufactured automobile tubes and patches.

Seth R. Clark, formerly connected with the Republic Rubber Co., Youngstown, Ohio, in charge of development work, is now associated with the Braender Tire & Rubber Co., Rutherford, New Jersey, as production manager.

THE RUBBER TRADE IN MASSACHUSETTS

By Our Regular Correspondent

IN ATTRACTIVENESS, attendance and wealth of handsome cars to choose from, the Automobile Show held at Mechanics' Building, Boston, from March 12 to 19, inclusive, lacked little of its former appeal. There were, however, more than 150 less exhibitors than last year, and it is to be feared that sales generally were not as satisfactory. None of the larger tire and rubber companies exhibited directly, although the products of some were noticeable in the numerous displays of accessory firms. The Green & Swett Co. featured Miller and Amazon tires; the J. P. Harriman Co., Syra-Cord tires; the Central Automobile Tire Co., tires and tubes of numerous popular makes. Special exhibits of interest to the rubber trade included Sewell cushion wheels and Lambert Troublpruf tires.

A. Schrader's Son, Inc., showed pressure gages, tire valves and accessories and the Harris Co., Inc., valve caps. L. J. Morse demonstrated Magic Rubber Mend and other rubber specialties, while tire paints and cements were displayed by the Boston Blacking Co. and J. P. Harriman Co. Rim and tire tools were featured by the Greb Co., Trexler Co. and Weaver Manufacturing Co. Air compressors and sundries were shown by the United States Air Compressor Co., C. A. Dickerson and the Curtis Pneumatic Machinery Co. Storage batteries were offered by the American Storage Battery Co., Paul M. Marko & Co., Inc., Willard Storage Battery Co., and Westinghouse batteries were included by the Jackson Electric Co. Tire chains were shown by the American Chain Co.; jacks by Edward V. Hartford, Inc., tire and wheel carriers by the New Era Spring & Specialty Co.; tire locks by the Alemite Lubricator Co. of New England.

MISCELLANEOUS MASSACHUSETTS NOTES

A trade tour of Mexico in the interest of New England manufacturers is to be made under the auspices of the Associated Industries of Massachusetts, leaving Boston March 12 and returning April 4. The roster of the party consists of forty-four names including R. Dunsford, treasurer of the Lowell Insulated Wire Co.; William B. Laighton, export manager of the Hood Rubber Products Co., Watertown; James E. McGrath, foreign department of the First National Bank of Boston.

The Crompton & Knowles Loom Works, of Worcester, is cooperating with the public school authorities in the work of immigrant education. English language classes have been organized for foreign-born employes with a present enrollment of 150 persons, including French-Canadians, Armenians, Greeks, Poles, Turks, Assyrians and Italians. Classes are held each working day except Saturday at the employment bureau in charge of a public school teacher who devotes her entire time to the work. There are five classes, each having a daily session of one hour, the first class starting at 11.30 a. m. and the last class closing at 4.30 p. m. No time is deducted from the employes while attending class.

The February 26 issue of *Industry*, the weekly bulletin of the Associated Industries of Massachusetts, contains a practical article entitled "Selling Safety in the Factory," by H. T. Martin, manager of the health and safety department of the Fisk Rubber Co., Chicopee Falls. Mr. Martin draws an interesting parallel between accident prevention work in the factory and a selling campaign to market the factory product, and shows that to succeed the former must be conducted on practically the same principles as the latter.

The tire department of the Converse Rubber Shoe Co., Malden, has begun the production of heavy duty cord tubes equipped with Whistler automatic safety tire valve gages.

The Boston Woven Hose & Rubber Co., Cambridge, was the lowest bidder on 2½-inch double jacket hose for the Boston fire department. The price quoted was 71¼ cents per foot, 10 days, and a contract for 3,000 feet was awarded.

After a two-weeks' shutdown the footwear factory of the Converse Rubber Shoe Co., Malden, will resume operations on a five-days-a-week basis, beginning April 4. This indicates a gain in activity, since a four-day week has been in effect since early in February.

Motion pictures of all processes in the making of rubber footwear have been taken recently at the factory of the Converse Rubber Shoe Co. The films show in careful detail every step in the making of various kinds of rubbers, from milling the rubber to packing the finished product, and will be used for educational and publicity purposes.

Converse Hall, a large three-story double house on Clifton street, Malden, purchased and remodeled at an expense of $25,000, now provides home comforts for thirty-five girl employes of the Converse Rubber Shoe Co. The lower floor is devoted to comfortable living and dining rooms and kitchen, the upper floors to bed-chambers and bathrooms. A laundry in the basement enables the girls to do their own washing. Board and room costs only $7 a week, a figure below that of any commercial boarding house.

The Athol Manufacturing Co., Athol, Massachusetts, has increased its capital stock from 1,000,000 shares preferred to 1,500,000, and 10,000 shares common to 20,000 shares, no par value.

BOSTON NOTES

A. L. Morton has resigned as director of the Boston office of the National Aniline & Chemical Co. and will enter the dyestuff business in Boston on his own account. Mr. Norton has been connected with the National company since the time of its reorganization.

Farley & MacNeill, Boston agents for the Cleveland-Standard fabric and Tiger-Foot cord tires, have leased a five-story building at 62-64 Stanhope street for the manufacture of electric storage batteries and kindred equipment. The Mac-Lite Storage Battery Co. is the firm name under which the new business is being conducted, its product being known as the Maclite "High Test" battery.

The New England Blacking Co., 24 Binford street, has been reorganized with Ralph L. Pope as president, D. P. Palmer as treasurer, while George Wachtler, who has been with the concern over twenty years, will continue as production manager. Mr. Pope was for several years vice-president of the Northeastern and Northwestern Leather Companies. The firm manufactures high-grade blackings, dressings, stains, cements, waxes, polishes and other specialties for shoe manufacturers and tanners. It proposes to develop and increase its business in rubber cement for the shoe manufacturing trade, and will establish a service department to aid the manufacturer in solving his problems.

Donald T. Hood, of the Hood Rubber Co., Watertown, is a director of the newly organized Boston National Bank, with a capital of $200,000 and a surplus of $50,000, which will open in Hanover street, Boston, on February 1. The bank has been formed by a group of representative Boston business men and Italian-American bankers, so that citizens of foreign birth or descent in Boston and vicinity may have banking facilities on the soundest basis that the banking system of the country provides.

The staff of the Boston office of the Swinehart Tire & Rubber Co. was banqueted recently at the home of the manager, J. C. Stoner, celebrating the close of the most successful year since the opening of the branch. The greatest sales increase has been in cord and cushion truck tires.

The annual meeting of the Franklin Rubber Co., 134 Federal street, Boston, Massachusetts, was held February 2, 1921. The following officers were reelected: Asa C. Merrill, president; Everett L. Fuller, treasurer; Lorin L. Fuller, assistant treasurer. Following the custom of the past few years, it was again voted that the employes of the company be given a bonus on their earnings of 1920, payable April 1, 1921. The Franklin Rubber Co. manufactures rain-proof and rubber goods and has its factory at Malden, Massachusetts.

F. Abbott Goodhue, vice-president of the First National Bank of Boston, has been chosen president of the International Acceptance Bank, Inc., of New York, which has been organized to finance American trade abroad. Daniel G. Wing, president of the First National Bank of Boston is also a director of the new organization. It will have a fully subscribed capital of $10,000,000 common stock, 250,000 shares of special stock, having no par value, and a subscribed surplus of $5,000,000. The bank will function mainly by granting short-term acceptance credits to aid American firms in developing foreign trade.

At the recent annual meeting of the Boston Belting Co. the following officers and directors were elected for the ensuing year: William E. Hardy, president; Fred H. Rice, treasurer; Lee M. Friedman, clerk; Harry H. Whitesel, George H. Corey, David W. Gray, Percival H. Peckham. The president reported that the factory had run full time for the year 1920 and had sufficient orders to insure continuation of operation. The treasurer's report showed current assets slightly more than four times current liabilities after allowing for an inventory write-off at cost or market, whichever was lower. The inventory approximates 16 per cent of the gross sales for the year, which totaled $1,411,000. Since the reorganization of the company in October, 1919, and after deducting for preferred dividends paid, reserves for taxes and dividends payable April 1, 1921, there remains $11.50 per share for the common stock issue.

Wallace O. Durell has been appointed representative of the Quaker City Rubber Co., Philadelphia, Pennsylvania, in the Boston territory. Mr. Durell's wide acquaintance among automobile men in this section should result in many Quaker tires appearing on New England cars this spring.

VICE-PRESIDENT, THE B. F. GOODRICH CO.

CHARLES BEEBE RAYMOND, vice-president of The B. F. Goodrich Co., Akron, Ohio, was born in Akron, February 12, 1866, and has always lived there.

His education was received in the Akron High School and Amherst College, Amherst, Massachusetts, from which he graduated in 1888. In 1918 Amherst College conferred on him the degree of M.A.

CHARLES B. RAYMOND

He began his business career in September, 1888, as secretary of the Akron Woolen & Felt Co., Akron, Ohio. In 1891 he accepted a position with the Goodrich Hard Rubber Co., Akron, Ohio, and has ever since been identified with the rubber industry. When this company became a part of The American Hard Rubber Co., in 1898, he was made manager and director of the Akron plant. This position he held until 1905 when he resigned to become assistant secretary of The B. F. Goodrich Co.; in 1907 he was advanced to secretary, in 1916 to second vice-president and in 1919 to vice-president.

Mr. Raymond is a director of the First-Second National Bank, Akron, Ohio; trustee of Kenyon College, Gambier, Ohio; was president of the Akron Chamber of Commerce, 1910-1912, and has been president of the Board of Trustees, Akron City Hospital, since 1910.

THE RUBBER TRADE IN OHIO

By Our Regular Correspondent

AKRON NOTES

WHILE the month just passed has been devoid of spectacular features of any kind in Akron rubber circles, it has been characterized by rumors that the waiting period is practically at an end and improvement in production is about to be realized. In the face of indefinite postponement of the meeting to complete its financial reorganization, the Goodyear company has speeded up to 60,000 tires a week. This is a little less than 30 per cent of the production of last July, which was beyond question the best month in the company's history.

The manner in which tire manufacturers have curtailed production during the past few months is shown by figures published in Akron and known to be authoritative.

In December of last year 350,071 tires were sold to manufacturers for new equipment and 977,082 to dealers for replacement. In addition to this, 39,278 tires were exported, making a total for the month of 1,366,431. During the same period only 506,111 tires were manufactured, showing that sales exceeded 860,320 tires. During November 649,742 tires were manufactured, and although figures for sales are not given, it is stated that they ran about in the same proportion as during the previous month.

Authoritative reports gave the number of tires in the hands of the manufacturers at the beginning of the year as 4,648,060. The first indication that the factory surplus was about used up came when it became known that The Miller Rubber Co. was rushing tires from distant branches to meet urgent orders at the factory. Other companies have not issued the same reports, but if the dealers persist in living from hand to mouth it is certain that the manufacturers will not put high-priced materials into manufactured goods and wait until the consumer gets ready to make his purchases.

If the first few weeks in April indicate that the dealer is ready to place orders for stock, the companies will speed up production accordingly. If, however, the hand to mouth policy continues, two months will see a clamoring for goods, in the opinion of rubber manufacturers.

The Firestone Tire & Rubber Co. reports that the monthly business of the company will probably run very close to $6,000,000. This spurt is taking place with labor costs decreased both by a 30 per cent increase in labor efficiency and a 20 per cent reduction in wages, so that the business will be very profitable. The factory is working two eight-hour shifts and will step up production with definite assurance on the part of the trade that buying has started. The company has notified dealers of a decrease in the price of tires, the percentage not being announced. The increase in the Firestone business followed the increased production at the Ford automobile plant in Detroit, Michigan, with which the Firestone plant is closely connected.

The Miller Rubber Co., in spite of the passing of the preferred dividend, has added a few men in the tire department following the reemployment of 500 men two months ago for the sundry and heel department. With $2,000,000 on deposit and only $10,000,000 preferred stock outstanding, the company believed it wise to conserve liquid capital resources by deferring payment of the preferred dividends. Few of the stockholders in Akron took exception to the action, because the statement was clean cut throughout, and they know the conservative policy of the company. The fact that an inventory shrinkage of $3,409,037 was written off makes it clear that the same policy of thoroughness ruled in this action.

The company now has current assets of $14,000,000, and aggregate current liabilities of $8,676,000.

The net loss for 1920, following the write-off, is given by William Pfeiffer as $617,878. The net profits before inventory write-off were $2,791,158.94, all earned during the first six months of the year. The sales during the past year jumped $4,000,000 not quite as large an increase as previous years have shown. from approximately $27,000,000 for the previous year. This is During 1920 the company retired the old first and second preferred and issued $10,000,000 of the new 8 per cent preferred stock.

The Portage Rubber Co. has doubled its production to 600 tires a day, to take care of orders received from unexpected quarters in the East. The company has enough orders on the books to keep going for several months.

Walter W. Evans has been made manager in charge of mechanical goods development for The B. F. Goodrich Co., with headquarters in Akron.

The largest single shipment of tires this year is said to have been made by The B. F. Goodrich Co. to the Ford Motor Co. The shipment contained 30,000 tires.

W. N. Fitch, former Goodrich safety man, heads the Chamber of Commerce committee, which will establish a safety club. The campaign for members will be unique in that membership certificates will be sent prospective members in the first letter, permitting the prospects either to sign or destroy their membership cards.

E. C. Shaw, formerly vice-president of The B. F. Goodrich Co., and for the past few years a leader in health work in Akron and Summit County, has been made a member and later elected chairman of the Ohio Board of Administration, which will have control of all penal and corrective institutions under a reorganized plan of state government.

More than $20,000,000 worth of public work ready to be resumed or undertaken with the coming of warm weather, together with the men put on in the Akron rubber plants, will clear the streets of unemployed men and women. Every effort is being made, however, by city and rubber company officials to prevent an influx of men into Akron. Chances for single men to obtain work in Akron will be very limited in the future. It will be the policy of the manufacturers to assist in building a stable city by the exclusive employment of married men as far as possible.

The Amazon Rubber Co., Akron, announces that production has been increased by at least 60 per cent, and that within the near future the plant will be back on its normal production basis.

The McAdoo-Akron Co., Akron, manufacturer of rubber gloves and sundries, was recently placed in receivership under Walter Akers, an Akron insurance and business man.

Scott D. Kenfield, Akron attorney and former city solicitor, has been named receiver for the Supreme Cord Tire & Rubber Co. The receivership was asked following the alleged absconding of a company official with one thousand dollars, according to court records.

Robert S. Wilson, formerly manager of the truck tire department of The Goodyear Tire & Rubber Co., Akron, has been named manager of the Chicago division of the sales department following the death of Herbert Ziegler, who was for many years in charge of the office. George E. Bruner, manager of the service department, has been named successor to Mr. Wilson. E. J. Samuels, manager of the organization division, has been appointed to take charge of inside sales at New York.

George C. Winchel, M. E., consulting and designing engineer, 600 Second National building, Akron, Ohio, graduated from Carnegie Tech, of Pittsburgh, Pennsylvania. He has been associated with The B. F. Goodrich Rubber Co. and The Goodyear Tire & Rubber Co. as designer, plant engineer and research engineer for a total of twelve years. His last industrial connection was as mechanical engineer with the Woodard Machine Co., Wooster, Ohio, manufacturer of rubber plant machinery and equipment. Mr. Winchel does not intend to specialize in any particular work, but will handle all branches of rubber plant design pertaining to buildings and equipment.

The State Savings & Trust Co., Akron, and the Merchants National Bank, Massillon, Ohio, receivers for The Biltwell Tire & Rubber Co., Barberton, Ohio, report considerable loss on account of the shrinkage in inventory and general expense of maintaining the company under the receivership. The company is considered in bad shape financially.

At the annual meeting held February 14, 1921, of The Mohawk Rubber Co., Akron, the following officers were reelected: R. M. Pillmore, president; S. S. Miller, vice-president and factory manager; C. W. McLaughlin, vice-president and treasurer; M. E. Mason, vice-president and sales manager; P. H. Goodall, secretary; W. J. Cope and R. E. Bloch, assistant treasurers. The directors were as follows: R. M. Pillmore, J. K. Williams, M. E. Mason, C. W. McLaughlin, S. S. Miller, H. L. Rose, George A. Parker and Francis Seiberling.

Recently The Akron Industrial Salvage Co., Akron, changed its charter from the type of a cooperative company, capitalized at $25,000, each stockholder being allowed one vote only, and each stockholder being allowed to hold not in excess of ten shares, to a capital of $500,000 without the above restrictions. The reason for the large increase is that the company contemplates the pur-

chase or building of a permanent home. Its operations are now being carried on in rented property. In November last the company paid a 10 per cent cash and 100 per cent stock dividend.

The recently elected officials of The Oldfield Tire Co., Akron, are: Barney Oldfield, president; J. M. Dine, vice-president and general manager; B. M. Robinson, secretary; H. L. Allsopp, treasurer, and M. E. Moffett, assistant treasurer.

The new factory of the Kelly-Springfield Tire Co., at Cumberland, Maryland, will probably be ready for operation on April 1. The company does not expect to discontinue manufacturing at Akron, Ohio, in the near future.

Gove & Co., Inc., crude rubber broker of 25 Beaver street, New York, has opened an office in the Central Savings and Trust Building, Akron, Ohio. H. S. Vorhis, well known in the rubber trade through his connection with association work, will be in charge representing the firm in the western territory.

AKRON'S FOREIGN TRADE PROSPECTS

Reports from all of the Akron rubber companies which do export business indicate that the economic conditions in most foreign countries are improving, so far as the rubber industry is concerned and the belief generally held among export managers is that foreign trade has seen its worst days and within the next few months will gradually come back to a more normal basis.

Orders received by cable from the various branch offices of the Akron companies indicate that January and February show a marked improvement over December. The improvement in exchange has materially increased business in Australia and will open the field in England, France and Belgium as soon as purely local economic conditions have been worked out.

The business in Argentina has not been as seriously affected by the economic conditions, which have been very bad in that country during the past few months, as was anticipated.

The orders received from Cuba during the past two months amount to at least half the original normal figure, in spite of the moratorium which is still in effect. The fact that the Cuban business is done on a strictly cash basis has made it very desirable.

Orders are being received in large numbers from Japan. These are looked upon as the first indication that the effects of the break in the silk market of last year are rapidly being effaced and a good business in that quarter of the Orient is anticipated.

The greatest surprise in the export business during the present year is an order for more than 100,000 automobile tires from Mexico, with full guarantees for payment. The change in administration, together with this large order, is making Akron manufacturers study this field with closer scrutiny.

In Germany the rubber companies have just started to make tires of the better grade, and the indications are that they will prove to be real competitors of the American manufacturers. At present their output is small, because of the limited number who are in a position to purchase tires, but it is believed the production will be increased as the demands of the country expand, and this will come with their ability to pay.

The American exporter in Germany, however, has to his advantage better sales methods and delivery systems if he establishes warehouses, it is believed, and, therefore, the Akron manufacturers are not forgetting the number of tires that country purchased in the past.

The shifting of export managers, the trips made and planned abroad, and the establishment of a branch of the foreign trade department of the government in the Chamber of Commerce, all indicate that foreign trade will be a larger factor in Akron business in the future than it has been in the past.

The Miller Rubber Co. has sent a letter to all salaried employes announcing decreases in salaries. The amount of the decreases is not specified, although it is understood that they will range from 10 to 25 per cent.

The B. F. Goodrich Co. is the only one of the four large companies which has not made similar announcements. Goodyear and Firestone salaries were decreased some time ago. Goodyear decreases ranged from 10 to 20 per cent and Firestone's a flat 10 per cent.

Alfredo Serretos, formerly Minister of War of Mexico, is now in the foreign trade department of The Miller Rubber Co. He has recently returned from Mexico, where he made a complete survey of the possibilities of trade expansion.

CLEVELAND NOTES

The Southwark Foundry & Machine Co., Philadelphia, Pennsylvania, has opened a district office at 804 Swetland building, Cleveland, where their direct representative, Stewart Bolling, a sales engineer, who has been with the company for seven years, will handle all rubber manufacturing machinery in the Cleveland territory. H. D. Andress will represent the firm on forged steel tire molds.

L. B. Timmerman will take charge of the Cleveland office of The Cutler-Hammer Manufacturing Co., Milwaukee, Wisconsin. He will also act in the capacity of assistant to A. G. Pierce, manager of the central district.

MISCELLANEOUS OHIO NOTES

Harvey J. Woodard has resigned as vice-president in charge of sales of The Republic Rubber Corporation of Youngstown, Ohio, and as president of The Canton-Blackstone Co., of Canton, Ohio, an affiliated subsidiary. He became associated with these companies in 1917, after serving the Diamond Rubber Co. for twelve years, from 1903 to 1912 acting as district sales manager in New York. Later he was sales manager for the Knight Tire & Rubber Co., Canton, Ohio. Mr. Woodard's withdrawal from his present activities in the rubber industry will be regretted by all who have been associated with him.

The Master Tire & Rubber Co., Dayton, Ohio, announces the reelection of the following officers: W. B. Ruston, president and general manager; G. H. Witsaman, vice-president and factory manager; H. G. Egbert, treasurer, and J. T. Nielson, secretary. The new board of directors consists of the officers and George Kramer, George Marshall, Jr., and Edward Luthman.

During the months of November and December the company is said to have closed $1,250,000 worth of business. After being shut down for six weeks, operations were resumed on January 3, 1921, and shifts were increased to two a day on February 1. The factory at present is approximately thirty days behind on deliveries. The company has closed large contracts in Cuba, India, Mexico and in South America.

The Columbia Tire & Rubber Co. has removed its general offices from Columbiana to Mansfield, Ohio, to occupy the new office building adjacent to the new plant. The new plant will be known as Plant No. 1, while the Columbiana, Ohio, plant will be Plant No. 2. All general business of the company will be transacted through the Mansfield offices, though both plants will be in operation as business warrants operations on a 100 per cent basis. The new plant is expected to begin operations April 15.

The Victor Rubber Co., Springfield, Ohio, announces the election of H. S. Berlin as president and general manager. Mr. Berlin was formerly in an executive capacity with the Firestone Tire & Rubber Co., Akron, and has been connected with the rubber tire industry for several years. H. H. Durr, as secretary and treasurer; Frank R. Talbott, factory manager; C. A. Swinehart, sales manager; J. J. Anzalone, comptroller, and P. C. Leffel, purchasing agent, will assist Mr. Berlin in the management of the company.

For 21 years the Victor Rubber Co. has produced rubber carriage tires and sundry products, and during the last seven

years has manufactured high quality automobile tires, of black tread cord and fabric in non-skid, ribbed and plain tread designs. Because of increased trade demand for Victor tires, it is said that full factory capacity will be reached as soon as practicable.

The American Zinc Oxide Co., Windsor avenue, Columbus, Ohio, a subsidiary of the American Zinc, Lead & Smelting Co., is marketing its products through the American Zinc Sales Co., distributer, which has been incorporated in Maine and licensed to do business in every state where offices are maintained. It is owned and controlled by the American Zinc, Lead & Smelting Co. and managed by the same officers. L. E. Wemple is manager in Columbus.

B. H. Loveless, 80 South Third street, Columbus, Ohio, has been appointed receiver for The Rotary Tire & Rubber Co., Zanesville, Ohio, in compliance with the application of the stockholders. It is stated that, in the opinion of the attorneys, claims can be successfully defended to the end that there will be $3 in assets to each $1 liability of the company. The receiver has been appointed chiefly to protect the estate against claimants whose positions are not legally tenable. Negotiations are now pending looking to the operation of the plant in the very near future.

The Portage Country Club, the gathering place of rubber and Akron business men, the scene of many gatherings which have made history in the rubber industry, was recently badly damaged by fire, the loss being placed at approximately $125,000. It has not been decided whether to build an entirely new building or repair the one that was damaged. A large unfinished apartment house across the street from the club grounds will probably be used as the temporary home of the club.

The Mason Tire & Rubber Co., Kent, Ohio, at a recent stockholders' meeting reelected the following directors: O. M. Mason, R. W. MacKinnon, William A. Cluff, W. R. Green, D. M. Mason, John H. Diehl and E. G. Tillotson.

Sales of this company showed about a 10 per cent increase in February, 1921, over those of February, 1920. The entire plant is said to have gone on a twenty-four-hour basis beginning March 14, in an effort to take care of the accumulating orders. The textile division, producing cord fabric, has been operating twenty-four hours a day for some time. Tire sales during recent weeks are showing very marked improvement. It is believed that consumer demand between April 1 and July 1 will be one-third greater than in any previous period.

The Cincinnati office of The Cutler-Hammer Manufacturing Co., Milwaukee, will become a part of the central district, with R. I. Maujer as branch manager.

Fred Rufenacht, New Philadelphia, Ohio, has contracted for the purchase of the entire properties of The Bucyrus Rubber Co. After extensive repairs and additions to machinery and equipment, Mr. Rufenacht will operate the plant under the name of the Rufenacht Rubber Co. It is expected the plant will be in operation at a very early date. A fabric tire in the 3½-inch size will be made at first, and later a cord tire in all the popular sizes.

At a recent stockholders' meeting of The Allsteel Ridewell Tire & Rubber Co., Dayton, Ohio, specializing in the manufacture of "Artyr" sectional metal steam bags and collapsible endless metal steam bags, the following were elected directors: A. Huetter, Henry Knapp, Joseph Jakob, S. Habodasz, Joseph Novak, N. Mikesell and R. O. Shank. The officers reelected were: A. Huetter, president and general manager, and H. Knapp, secretary-treasurer.

At a meeting of the stockholders of The Eclat Rubber Co., Cuyahoga Falls, Ohio, in February, the old board of directors were reelected. They are: W. H. Stillwell, C. C. Crumrine, C. E. Reiss, J. A. Seabold, E. F. Ast, W. A. Heffelman, S. W. Sweet and W. E. Weldon. The officials elected were: W. H. Stillwell, president; J. A. Seabold, vice-president; C. C. Crumrine, treasurer, and E. F. Ast, secretary.

The McKone Tire & Rubber Co., Canton, Ohio, has purchased the plant and equipment of The Forster Tire & Rubber Co., Millersburg, Ohio. Pending the time operations are commenced, it is having its tires made by The Tuscan Tire & Rubber Co., Carrollton, Ohio.

EXCLUSIVE RUBBER GLOVE MANUFACTURER

The Wilson Rubber Co., Canton, Ohio, was incorporated under the laws of Ohio, July 18, 1916, by Fred Wilson, John S. Willis and Wendell Herbruck, with a capital of $40,000, that has been successively increased to $75,000, $150,000 and on January 22, 1921, to $500,000. The company manufactures rubber gloves for electricians, surgeons and household purposes, and it is said to be the largest exclusive rubber glove manufacturer in the country.

The company leased the plant formerly occupied by the Canton Manufacturing Co., Canton, Ohio, when commencing business, and in 1918 built a new factory on Garfield avenue, where an

THE WILSON RUBBER CO., CANTON, OHIO

addition 50 by 100 feet, three stories high, is now being constructed with foundation strong enough to permit the addition of two more stories if business justifies. The present addition will cost $75,000, and a like amount will be required for equipment.

It is reported that since the company began operations in 1917 there has not been a time when they were caught up on orders and that it has been necessary to turn down all new business during the past year. The new addition shown on the left of the picture is expected to take care of this increased business.

The following officers were reelected for this year: John S. Willis, president; F. J. Wilson, vice-president and general manager; and Wendell Herbruck, secretary and treasurer.

THE RUBBER TRADE IN THE MID-WEST

By Our Regular Correspondent

THE MID-WEST RUBBER MANUFACTURERS' ASSOCIATION has adopted a resolution calling the attention of the public to the detrimental effect on the rubber industry that would result from any substantial curtailment of carbon black production.

George J. Kirkgasser & Co., 1734 First National Bank Building, Chicago, is handling the advertising for The Cutler-Hammer Manufacturing Co., the Pawling & Harnischfeger Co., Wetmore Reamer Co., and Frank D. Chase, Inc., industrial engineers. Although specializing in work for industrial concerns, the agency is not limiting itself entirely to technical fields. Services include organization work, development of cooperation between selling and advertising departments, advertising, merchandising and publicity.

Mr. Kirkgasser was in the advertising department of Force Food Co. for a year and a half; and with The Cutler-Hammer Manufacturing Co. from 1910 to 1914 as assistant advertising manager, then assuming the duties of advertising manager. He

previously did electrical engineering and inspection work in the East. With him are associated F. C. Smith, previously connected with the McGraw-Hill Publishing Co. and the Manufacturers Publicity Bureau, and Miss A. A. Buchholtz, formerly office manager of the advertising department of The Cutler-Hammer Manufacturing Co.

The Ardmore-Akron Tire & Rubber Co., Ardmore, Oklahoma, has opened a factory branch at Springfield, Missouri, to care for the southern Missouri trade. Shipments will be made to Springfield in carload lots and distributed from there to dealers. Barney Sittel is branch manager in charge.

G. S. Crane, formerly manager of the Cleveland office of The Cutler-Hammer Manufacturing Co., will become manager of controller sales at the main office in Milwaukee, Wisconsin.

The clutch department of The Cutler-Hammer Manufacturing Co., Milwaukee, Wisconsin, has been moved from the main works to a recently acquired plant in West Allis, about seven miles away. The new plant increases the total floor space by 100,000 square feet.

The Miller Tire & Rubber Co., Akron, Ohio, has opened direct factory tire branches at 1405 Fourteenth street, N. W., Washington, D. C., and 1329 Union avenue, Kansas City, Missouri.

The Black Hawk Tire & Rubber Co., Des Moines, Iowa, had an attendance of about 200 stockholders at the second annual stockholders' meeting on February 15. The following officers and board of directors were reelected: William Moran, president; E. J. O'Malley, treasurer; E. A. Lewis, secretary; A. J. McColl, John C. Kirby, Fred German and John L. Nedderson. It is the present plan of this company to put out a new line of cord tires to be known as the "Black Hawk Chief." Tube production has increased 100 per cent, and in the near future tire output will be doubled, it is expected.

The Reed Motor Supply Co., St. Paul, Minnesota, has been appointed distributer of Syra-Cord tires, manufactured by the Syracuse Rubber Co., Inc., Syracuse, New York. The officers of the Reed company are: Henry H. Orme, president, and Edgar A. Reed, secretary-treasurer and general manager.

The National Auto Supply Co., Chicago, Illinois, of which W. C. Erkert is president, announces that it has been appointed the exclusive sales rights in the Chicago territory for Syra-Cord tires, a product of the Syracuse Rubber Co., Syracuse, New York.

Earl L. Woods has been elected a director and vice-president of the Horse-Shoe Rubber Co., of Missouri, 1705 Grand avenue, Kansas City, Missouri, and will direct the Kansas City branch. Before going with the Horse-Shoe Rubber Co. he was a director of Wallis Tractor Sales for the J. I. Case Plow Works Co., Racine, Wisconsin, and sales manager for the Samson Tractor Co., of California.

The India Tire & Rubber Co., Akron, Ohio, announces that F. W. Abbott, of Minneapolis, has been selected to look after its interests in that district. The sales of the company are rapidly picking up and during last month exceeded those of any other month in the history of the company with the exception of one.

The first annual meeting of the Barva Heel & Tire Factory, Inc., Fort Wayne, Indiana, was held recently at which the following directors were elected: B. R. Barva, F. T. Wichman, J. B. Franke, Allen J. Vesey and M. A. Mason. Officers elected were B. R. Barva, president; J. B. Franke, vice-president; and F. T. Wichman, secretary and treasurer.

The Armstrong Rubber Co., Garfield, New Jersey, has opened a factory branch at 1414 South Michigan Boulevard, Chicago, under the management of F. A. Winship, who was formerly sales manager at the New York office, 2 West 61st street. A model tire store is being fitted up in Chicago with everything needed to make it up to date in every respect.

A NATIONAL ASSOCIATION OF TIRE DEALERS

The National Tire Dealers' Association was organized February 2 at a formative meeting held at the Morrison Hotel, Chicago, Illinois. Cleveland, Ohio, was selected as the national headquarters and officers were elected as follows: President, Thomas F. Whitehead, Chicago, Illinois; vice-president, R. F. Valentine, Cleveland, Ohio; secretary, Phillip O. Deitsch, Cleveland, Ohio; treasurer, H. O. Stenzel, Milwaukee, Wisconsin. The directors, in addition to Messrs. Whitehead, Deitsch and Stenzel, are Edward P. Farley, Minneapolis, Minnesota, and A. B. Clark, Kansas City, Missouri, for one year; Joseph Roberts, St. Louis, Missouri, R. J. Walters, Baltimore, Maryland, and R. R. Woolley, Cincinnati, Ohio, for two years.

The purpose of the association, according to the constitution, is to advance and safeguard the business interests of tire dealers and to promote a cooperative relationship between the manufacturer, tire dealer and buying public. That an effort will be made to place the retail tire trade on a higher ethical plane is evidenced by two resolutions adopted at the organization meeting. The first defines the legitimate tire dealer, one of the principal qualifications being policies not dictated by any manufacturers. The second aims to stop fraudulent rebuilding of worn-out tires by recommending that members cut in two all junk tires before disposing of them to any one. Membership in the association is composed of such local associations of ten or more members as are recognized by the national association.

The key-note of the entire organization session was the willingness evidenced by the dealers to enlist the absolute cooperation of the manufacturer, and executives of the large rubber companies who attended the closing banquet declared that the new association would be an important factor in the advancement and future governing policies of the tire industry.

MUCH ZINC OXIDE IN SIGHT

The recent blowing in of the first unit of the new zinc oxide plant of the American Zinc, Lead & Smelting Co., which has been under construction during the past year at Columbus, Ohio, marks another milestone in the company's development.

This company started business in 1899 as a small zinc ore producer, with mines in Joplin, Missouri, and has progressively developed, until today its properties consist of three large zinc smelters, one lead smelter, extensive ore mines in Tennessee, Wisconsin and Joplin, Missouri, and other assets totaling over $18,000,000. The development of the mining properties in Tennessee showing a large tonnage of lead-free zinc ore, led to the

AMERICAN ZINC, LEAD & SMELTING CO.'S COLUMBUS PLANT

decision five years ago to embark in the zinc oxide business, and they erected the first plant adjacent to their large spelter and acid plant at Hillsboro, Illinois.

Columbus, Ohio, was selected as the location for the new zinc oxide plant because of the central location of the mines, the abundant railroad facilities and nearness to the central consuming markets. The latest improvements in metallurgical construction and equipment for handling materials are embodied in this plant, and thoroughly experienced men are in charge of operations.

The plant consists of a 75 by 240-foot reinforced concrete and steel furnace building, accommodating 24 furnaces. Close by is

the mix-room, where fuels and flux are combined with the ore preparatory for smelting. The zinc oxide is drawn from the furnaces through large cooling chambers and flues, and blown into innumerable long cloth bags. The very light zinc oxide is retained by the bags, while gases and air are permitted to escape. The zinc oxide is mechanically collected from the baghouse, reprocessed and refined into a uniform product of over 99 per cent purity.

Comprising the additional equipment are a concrete and steel trestle 500 feet long, having a storage capacity for over 25,000 tons of ore and fuel unloaded from railroad cars by gravity; several miles of industrial track for conveying raw materials; machine repair shop; operating supplies storehouse; plant for crushing ores and fuels; cooper shop for making shipping barrels; storage warehouse for packed oxide; a 300,000-pound capacity track scale for weighing incoming and outgoing materials and a change house for white and colored labor.

The 50 by 75-foot reinforced concrete and brick building at the Windsor avenue entrance, houses on the first floor the administrative and accounting offices, and on the second the chemical, research paint and research rubber laboratories, each completely equipped for the small-scale manufacture of various finished products containing zinc oxide, and the determining of the most satisfactory methods of using zinc oxide for the customer's benefit.

THE NEW SECRETARY OF THE MID-WEST RUBBER ASSOCIATION

JAMES P. MATTHEWS, who assumed the duties of secretary and general manager of the Mid-West Rubber Manufacturers' Association on March 1, brings to that office a remarkably varied practical experience in the rubber industry and other lines of work which will be valuable in his new activities.

JAMES P. MATTHEWS

Born in 1872 at Onondaga, Michigan, he graduated from the high school of Cedar Rapids, Iowa, attended the normal college at Valparaiso, Indiana, and later took an extension course at Chicago University, acquiring a good knowledge of Spanish, French, Bohemian and Malay.

His business career was begun in the engineers' department of the Chicago, Rock Island and Pacific Railway. Then came six years as a teacher in the public schools of Iowa, Michigan and North Dakota, followed by ten years in the office of the Cedar Rapids Pump Co. For three years he was assistant manager and then advertising writer of the Des Moines, Iowa, branch of the Crane Co. This latter work led him into the newspaper field in 1911, when he became private secretary to United States Senator R. M. Johnston, editor of the *Houston Daily Post*, going two years later to the *Milwaukee Daily News* as an editorial writer.

In 1916 Mr. Matthews became identified with the rubber industry, joining the forces of The Mason Tire & Rubber Co., Kent, Ohio, as purchasing agent. Since that time he has acted in various capacities for this company, and in 1920 he was made representative of the Mason company at Singapore, Straits Settlements. His investigation of the crude rubber position included the rubber districts of Sumatra, Ceylon, Java, Malaya and the Straits Settlements.

Mr. Matthews is a Republican, a member of the National Union Assurance Society, Musicians' Union, and the American Malaya Association, while his fraternal orders include the Odd Fellows, Knights of Pythias, Elks and Tribe of Ben Hur.

THIRTY-FIVE YEARS IN THE RUBBER TRADE

RICHARD H. GEIER, secretary of W. H. Salisbury & Co., Inc., Chicago, Illinois, manufacturers and distributors of mechanical rubber goods, etc., was born in Hamburg, Germany, March 28, 1870. In 1871 he came to Chicago, with his parents, and was educated in the public schools and a business college of that city.

RICHARD H. GEIER

In 1886 he entered the employ of W. H. Salisbury & Co., Inc., as an errand boy, and was successively advanced from the shipping room to bill clerk, order clerk, assistant buyer, buyer, manager of the mechanical rubber goods department, and for the past seven years has filled the position of secretary. He is also a director of the company.

Mr. Geier's home is in Oak Park, Illinois, and he is a member of the Hardware Club of Chicago, the Chicago Motor Club, and for several years has been on the ways and means committee of the Chicago Association of Commerce.

THE RUBBER TRADE ON THE PACIFIC COAST

By Our Regular Correspondent

SAN FRANCISCO

A DECIDEDLY IMPROVED TONE to business is noted by dealers in automobile tires in both the central and southern sections of California. Many car owners who had put off getting renewals until Spring are now entering the market, and as a result stocks are being noticeably lessened. Dealers talk in a much more cheerful tone than a month ago, and they look for a real revival soon.

With R. L. Brown as president and general manager, the California Rubber Co. has been incorporated in San Francisco to manufacture a high-grade cord tire, inner tubes, hose, tubing, and mechanical rubber goods. John R. Jones, an attorney, is secretary, and Henry P. Adams, for many years associated with the San Francisco Chamber of Commerce, is treasurer and assistant to the president. Offices are in the Oceanic Building, and a factory, it is reported, will be either built or bought in the very near future.

The San Francisco Tire Co., a subsidiary of the Keystone Tire & Rubber Co., has been put in the care of I. Brenner, administrator of the Keystone stores in New York city, and the concern has moved into larger quarters on Van Ness avenue near Eddy street.

The Pacific Rubber Co., distributer of Horseshoe tires, has, in addition to its branches at Los Angeles and Oakland, established one at Fresno to serve trade in central California.

R. L. Block has been appointed branch manager of The Spreckels "Savage" Tire Co., San Diego, at San Francisco, succeeding A. E. Kelley, promoted.

C. W. Dennison has been appointed Pacific Coast manager of The Mason Tire & Rubber Co., Kent, Ohio, with headquarters in San Francisco.

The Pioneer Rubber Mills, San Francisco, announces that it has awarded a contract to Cahill & Vensano Co., 110 Sutter street, for a new one-story plant at Pittsburg, California. The new

unit involves an investment of approximately $250,000. It is to be used for the production of continuous length molded garden hose, and will have an annual capacity of approximately 15,000,000 feet.

Milton M. Katz has been appointed office manager of the San Francisco warehouse of The Federal Rubber Co. of Illinois, Cudahy, Wisconsin.

J. F. Damon, formerly with The B. F. Goodrich Co., Minneapolis, is now special factory representative of the Samson Tire & Rubber Corporation, Los Angeles, with San Francisco headquarters.

LOS ANGELES

J. Elden Shaw, former sales manager of the Savage Tire Sales Co., of Des Moines, has returned to the Pacific Coast, where he is now district manager of the Standard Four Tire Co.'s coast business, with headquarters in Los Angeles. He had been with the Spreckels "Savage" concern six years. F. R. Eyer will be general sales manager for the Standard Four coast branch.

G. C. Williams, branch manager, has opened the Stephens Tire Store at 1224 South Grand avenue, Los Angeles, for the distribution of the products of the A. J. Stevens Rubber Co., Kansas City, Missouri, makers of tires, tubes, blow-out patches, etc.

The Samson Tire & Rubber Corporation, Compton, California, the main office of which is at 333 West Pico street, Los Angeles, of late has been running full capacity and overtime. The annual report shows assets five times in excess of liabilities, and that its crude rubber is being carried at 1921 prices. Last year Samson tire dealers increased 715 per cent and sales 315 per cent. The company is "running strong" on its cord tire in various sizes. In the middle of February the State of California officially adopted the Samson cord and fabric tires, also the red tubes, for its fleet of vehicles.

The West American Rubber Co., 400 North Avenue A, Los Angeles, which has been making several improvements recently in its plant, has been specializing lately on rubber supplies for oil drillers and various novelties for the motion picture and general theatrical business. The concern also does much vulcanizing of giant truck tires and extra large work for repairmen.

A. C. Lester, former manager of the Los Angeles branch of The Spreckels "Savage" Tire Co., San Diego, has been made Pacific Coast district manager. He is succeeded by Paul R. Stockton.

The Mason Tire & Rubber Co., Kent, Ohio, has opened a direct factory branch at 1232 South Grand avenue, Los Angeles, with J. M. McCoy in charge.

SOUTHWESTERN NOTES

A. E. Kelley, formerly San Francisco branch manager of The Spreckels "Savage" Tire company, has been made manager of the company's export department at San Diego.

J. C. Collins has been advanced from the accounting department of the Spreckels company to the post of branch manager at Dallas, Texas.

The Ardmore-Akron Tire & Rubber Co. was incorporated February 17, 1917, under the laws of the State of Oklahoma, with authorized capital stock of $1,000,000 divided into 10,000 shares of the par value of $100 each, fully paid and non-assessable, of which $500,000 is 7 per cent cumulative preferred stock and $500,000 common stock. The incorporators were John C. Harmony and Charles A. BeSaw, both of Canton, Ohio, and Elmer S. Wood, Fort Smith, Arkansas. The plant is located at Ardmore, Oklahoma. The building was begun in 1917, with a floor space of 27,000 square feet and a capacity of 500 tires and tubes per day. One unit of the plant has been in operation for some time and the second unit will be operating shortly. Orders on hand will necessitate the manufacture of from 250 to 300 tires a day within the next sixty days.

The officers of the company are: Fox Wood, president and general manager; Elmer S. Wood, vice-president; Roy G. Wood, secretary; Arthur C. Wood, treasurer and J. E. Harris, sales manager. Mr. Harris brought to the company a complete sales organization and it is said the entire output of the plant for 1921 has already been sold.

NORTHWESTERN NOTES

The Hood Rubber Co., Watertown, Massachusetts, has made Seattle its Northwest distributing point, having bought the business of the West Coast Rubber Co., 214 South Second avenue. This concern has distributed Hood products for the past eight years. H. L. Hansen, manager of the old concern, will be manager of the new factory branch.

P. W. Hall, formerly with the Mid-Continental Tire Co., is now district manager of the Samson Tire & Rubber Corporation, Los Angeles, with headquarters at Seattle, Washington.

George G. Vogt, head of the Rubber Service Co., 1023 Pike street, Seattle, has taken the local agency for Kelly-Springfield tires.

The B. F. Goodrich Rubber Co. has removed its Portland, Oregon, branch from the old headquarters at Broadway and Burnside street to its new $45,000 building at Twelfth and Glisan streets. Wholesale business only will be handled. Carl B. Cadwell is Goodrich Portland manager, his territory including all of Oregon and the Columbia river counties of Washington.

The Mason Tire & Rubber Co., Kent, Ohio, has opened a branch establishment at 82 North Broadway, Portland, Oregon, with Catlin L. Wolfard in charge.

CANADIAN NOTES

The Dunlop Tire & Rubber Co. Limited, Toronto, Ontario, announces the appointment of S. C. Mitchell, for many years sales representative in the Saskatoon territory, as divisional manager for the company with headquarters at Regina, Saskatchewan.

The K. & S. Tire & Rubber Goods, Limited, Toronto, Ontario, has recently completed its tire and tube factory and is now manufacturing about 200 tires and 300 tubes daily. The company anticipates doubling the output within a few months, as there are sufficient orders on hand to warrant working 24 hours a day until the end of the tire season. The druggists' rubber sundries department is working on a 24-hour-day basis.

The Kaufman Rubber Co. Limited, Kitchener, Ontario, has secured the Great West Rubber & Footwear, Limited, recently organized in Lethbridge to carry on a wholesale footwear business, as its representative for "Life-Buoy" rubbers in the territory adjacent to Lethbridge, Alberta.

F. B. McIlroy, president and general manager of The McIlroy Belting & Hose Co., Hammond, Indiana, a short time ago organized The McIlroy Belting Works of Canada, Limited, having headquarters at Kingsville, Ontario, with a capital of $50,000. Mr. McIlroy who is the sole owner of the stock, is also the president, treasurer and general manager of the company, the vice-president, and secretary will be elected at the first meeting of the stockholders to be held shortly. The products manufactured by the Canadian company will be the same as those of the Hammond, Indiana, company, namely, "Rubber-ite" solid woven and stitched canvas belting, and fire hose. It is the intention of the Canadian company to sell to the Australian and South African trade, also to large jobbing houses in Canada.

THE NANYO GOMU TAKUSHO KAISHA, A JAPANESE COMPANY engaged in the cultivation of rubber in Johore, Malay Peninsula, and capitalized at 2,000,000 yen (1 yen equals normally $0.4985 in United States currency), has declared an 8 per cent per annum dividend and a net profit for the past term of 21,388 yen. This season's crop showed an increase of 17,600 pounds over that of the previous term.

THE RUBBER TRADE IN RHODE ISLAND

By Our Regular Correspondent

THE MONTH of March witnessed a partial resumption of activities by the manufacturers of rubber goods of every description in Rhode Island, although many of them only operated their plants to about one-half their normal capacity.

After a shut-down of nearly three months, the National India Rubber Co., at Bristol, resumed operations in all of the various departments of the concern on Monday, March 7. During the weeks that the plant had been idle some repairing and renovation were done and several important changes in the personnel of the department heads were decided upon. These were particularly noticeable in connection with the foremen, inspectors and other executives of the different rooms and these men all assumed their new positions when the factory resumed.

The reopening of the National Rubber Co.'s plant was welcomed by the more than 4,000 operatives and their families, particularly those who had been out of work since the factory first began to curtail the latter part of last December. Fortunately for some of the employes, there had been a little work that kept a few in during January, and some in February, but those who had been out of employment since December had found it to be a great hardship. The hope of steady employment was short-lived, however, for about the middle of the month came rumors of another curtailment.

In some instances girls have asked whether it would be possible to get a leave of absence this Summer in order to do work outside of the factory. In all such cases the management has said it would be glad to grant leave of absence to any person in good standing provided that the exact length of leave be specified and it will be understood that any persons taking such leave may return to the factory after the leave has expired and resume their present status with the company.

On daylight saving, the factory will follow the decision of the Bristol Town Council, which has voted to start daylight saving on Sunday, March 27, at which time all clocks should be moved forward one hour.

The wire division of the National rubber plant did not shut down when the shoe departments were closed, but has been operating for several weeks past on a short time schedule. It is expected, however, that within a few weeks there will be sufficient improvement in conditions to call for a full-time schedule.

The announcement was made March 23 that neither the Alice Mill at Woonsocket, nor the Millville plant at Millville, the footwear division of the Woonsocket Rubber Co., would reopen for six or eight weeks longer. The Alice Mill has been idle since February 19 and that at Millville since December 10. Some 2500 operatives are affected. It had been indicated previously that the plants might reopen early in April but the announcement of March 23 stated that orders have not been received in sufficient volume to warrant starting up the mills at a reasonable capacity for an extended period, but that it is now expected that within six or eight weeks enough business will be on hand for resuming operations. The official announcement also provided further curtailment of the working force effective April 1. This affects some 75 or 80 persons, including clerks, mechanics, watchmen, etc., who have been retained while the mills have been closed.

All the rights and patents of Charles A. Gonzenbach, late of Warren, Rhode Island, deceased, relating to machines for distending and turning tubular fabrics, were sold at public auction in the District Court room at Warren, by order of the administrator. The purchase was made by the Swiss Textile Co., of Assonet, Massachusetts, formerly of Warren. Mr. Gonzenbach was one of the organizers of the Swiss Textile Co., and he invented practically all of the machines which were used in the business which he was connected with up to the time of his death.

Superintendent Kennedy, of the Tubular Woven Fabric Co.'s plant at South Woodlawn, states that business at the present time is somewhat slow and that such orders as are being received are being filled in part from an accumulated stock. He was very optimistic, however, and said that he looked for an early return of normal business conditions and an increase from the present curtailed force of approximately 200 workmen to a complete equipment and full time schedule.

BROADENING SAFETY WORK IN RUBBER FACTORIES

That the field for safety work may be considerably broadened so as to benefit the rubber industry, as well as most other industries, was the point stressed by A. A. Frank, factory manager of the Federal Rubber Co., Cudahy, Wisconsin, at the Ninth Annual Safety Congress in Milwaukee, Wisconsin.

Good industrial relations, he declared, are fundamental to safety in industry. A plant with a good morale is generally one with a low accident record. In safety he would include not only all precautions against injury to an operative while at work, but also clean surroundings, fair wages, efficient work, proper home protection, recreation, and personal interests. He insisted that efficiency is more essential to safety than safety to efficiency, as most executives believe.

Nothing helps so much in successfully carrying through an accident prevention campaign as agreeable industrial relations, said Mr. Frank, and nothing helps so much to promote such relations as imbuing employes with implicit confidence in the employing concern. He welcomed the new experiments in industrial democracy, shop committees, etc., being tried out by leading rubber and other manufacturers. Instead of allowing foremen to lay out their departments, locate machinery, and plan the movement of material, such work is done more efficiently by a department or a competent individual, who considers not merely the utmost advantage of the plant but the maximum safety of the operatives as well. Standardizing trucks and training men to handle trucks only, have reduced accidents notably in one large plant. In his own plant he remarked that accidents were fewer among piece workers than day workers, the former often consciously or otherwise acquiring a habit of operating in the simplest and yet the least hazardous way. A study of such operations, he believed, was worth the attention of industrial engineers.

Not only is labor turnover one of the most costly items in industry, said Mr. Frank, but experience has shown that accident losses always rise as turnover increases. Here is where an efficient employment man can help in safety and in promoting better industrial relations. He emphasized the importance of foremen being tactful as well as energetic in managing the production department employing 75 per cent of the men, so that not merely would work be expedited but all the safety rules be easily carried out. All departments should and could cooperate, he said, so as to easily insure the maximum of health, safety, and efficiency among workers.

GUMMED SEALING TAPES THAT ADVERTISE

Gummed sealing tape is well known in the packing room for quickly sealing cartons, bags and paper wrapped packages, to the manufacturer of textiles as a successful "slasher" tape, holding every thread in place, and in the storeroom for patching broken packages. Aside from these, Liberty tape has a service to perform for the tire manufacturer. A ¾-inch-wide tape on which the tire manufacturer's name is printed is used around the circumference of the tire after it has been paper wrapped. The roll of gummed tape is attached to a standard on the wrapping device, and as the operation of paper wrapping is done, the tape is unrolled over a rubber moistening roller and stuck onto the wrapper. A 3-inch-wide tape on which can be printed the name, address and trade-mark of a manufacturer, is used principally on corrugated and fiber shipping cases, and in the tire industry for sealing up cases of inner tubes.—Liberty Paper Co., Inc., 52 Vanderbilt avenue, New York.

Activities of The Rubber Association of America

MEETINGS

THE EXECUTIVE COMMITTEE of the Rubber Sundries Division, met at the Union League Club, New York, on the evening of Tuesday, March 8. A Rubber Band Committee, a Membership Committee, a Merchandise Committee and a Packing and Shipping Committee, were appointed to give special attention to the subjects indicated by their titles. It is hoped that through the medium of these committees a livelier interest on the part of all members in the affairs of the divisions will be promoted. A decision was also reached to institute in the Rubber Sundries Division a plan for the compilation of statistics concerning the monthly inventory, production, sales, shipments, etc.; or some other method suitable to the need of the Division. Preliminary action has been taken to put the plan into operation.

The Specification Committee of the Mechanical Rubber Goods Manufacturers' Division met March 12 in the Association offices with a sub-committee of the Committee on Specifications and Tests for Material of the American Railroad Association, when detailed consideration was given to the matter of standard specifications for rubber goods used by railroads. A regular meeting of the Specification Committee was held on the following day, when routine matters were given attention. A very lengthy docket was presented which completed many of the subjects the committee has been working on during the past year.

The Executive Committee of the Mechanical Rubber Goods Manufacturers' Division met March 15 and a very interesting meeting was had. Matters of general interest to mechanical rubber goods manufacturers were discussed. The schedule of meetings was changed to the fourth Tuesday in each month instead of on the third, as heretofore.

The Executive Committee of the Tire Manufacturers' Division met in the Association office, March 16. Cooperation with the National Tire Dealers' Association, the support by tire manufacturers of "good roads" projects, and several other important matters were discussed.

Meetings of the Rubber Clothing Division and the Rubber Proofers' Division of the Association were held at the Copley-Plaza Hotel, Boston, Massachusetts, March 30.

A meeting of the Executive Committee of the Foreign Trade Division was held in the Association offices, Tuesday, March 29.

ASSOCIATION PUBLISHES BULLETIN

The first issue of *The Rubber Industry*, a printed bulletin which will be distributed semi-monthly by the Association will be sent to all members within a few days. The use of the printed bulletin will eliminate to an extent the necessity for distributing multigraphed letters as has been the case heretofore, although the intention is to continue the use of bulletins whenever necessary.

QUESTIONNAIRE NO. 104

The statistics obtained as a result of the Association's Questionnaire No. 104 covering the second six months of 1920, will be compiled and distributed to all rubber manufacturers, members of the Association, at an early date. It is felt that a perusal of the figures contained therein with the figures covering the business during the first six months of 1920, will afford a clear outline of the change in conditions during that year.

PROTECTION AGAINST PRICE DECLINE

The attention of tire and footwear manufacturers is called to the formal announcement by the Federal Trade Commission that it will take no definite stand for or against the practice of guaranteeing to the distributor or dealer protection against loss on goods unsold in the event of a decline in prices.

In view of the large number of complaints received by the Commission against the practice, and in view of the inquiry instituted by the Commission, resulting in expressions from more than 350 manufacturing and selling concerns including trade associations whose represented membership must be more than double the number of individual statements, the results shown may be taken, the Commission believes, to be representative of the difference in business opinion on the subject.

The Commission, therefore, has decided to consider each case of complaint of this character upon the facts shown in the specific case, applying the legal tests thereto, and its attitude will be developed by its disposition of the large number of complaints now pending on the docket.

SURVEY OF INDUSTRIAL WASTE

The Federated American Engineering Societies under the presidency of Herbert Hoover has arranged for the organization of a preliminary survey of the weaknesses of the industrial productive system and its efficiency with relation to maximum production.

A committee of sixteen members, including Mr. Hoover, were appointed to the Committee on Elimination of Waste in Industry, and the industries selected for study are: textile, automobile, garment, rubber, metal trades, railroading, bituminous coal mining, printing, paper, shoes and building construction.

A member of the committee has been placed in charge of each of the surveys covering the industries above mentioned. C. E. Knoeppel, New York, member of the Society of Mechanical Engineers, and the Society of Industrial Engineers, has been charged with the responsibility of covering the rubber field.

An unbiased analysis of some of the representative plants is contemplated. All information secured will be treated in strict confidence. The industries and plants will be designated by letters and numbers so that any information secured cannot be traced to individual plants.

REPORT OF THE TAX COMMITTEE

The National Industrial Conference Board's Tax Committee, of which The Rubber Association is a member, made its final report in January to the Executive Committee of the Conference Board which ordered the report printed for publicity and discussion at the third tax conference held by the Board in New York, January 21 and 22 of this year.

Two features of the Federal taxation system stand out with particular prominence as requiring immediate consideration, (1) the repeal of the excess profits tax law, (2) the reduction of surtaxes on individual incomes. Nothing convincing can be said in favor of either.

Many organizations and individuals are supporting a general sales tax in one form or another and The Rubber Association should aid in supporting a sales tax since experience has proved that it is the easiest of interpretation for business, simple in administration for the Government, a businesslike system since it provides revenue for the Government monthly out of current business, fair to the public as it can be passed on in its entirety and without inflation and even if it cannot be passed on in the price to be obtained for the article, in this respect it is no more harmful than the present law providing for the taxation of corporate income.

In conclusion the committee recommends: (1) the repeal of the excess profits tax law; (2) the reduction of surtaxes on individual incomes; (3) the elimination of all unnecessary expense in the operation of the Government; (4) the adoption of a more adequate tariff measure; (5) the retention of the income tax on corporate income at a rate not to exceed 10 per cent; and (6) the adoption of a general form of sales tax, at least with reference to all manufactured goods finished in a state for final use or consumption.

ANNUAL MEETING, CHAMBER OF COMMERCE OF THE UNITED STATES

F. A. Seiberling will represent the Association as national councillor, and J. A. Lambert as alternate, at the Ninth Annual Meeting of the Chamber of Commerce of the United States, to be held at Atlantic City, New Jersey, April 27-29. The other delegates are A. L. Viles and one to be appointed later.

TIRE BUNDLING SPECIFICATIONS REVISED

The Traffic Committee recently appeared before the Consolidated Freight Classification Committee requesting revision of the specifications for wrapping tires in order to include additional types of paper. As a result of this hearing, the following revised wrapping specifications have been adopted and will appear in supplement No. 1 to Consolidated Classification No. 2, effective on or about May 1, 1921. Pending the effective date, shipments wrapped in accordance with these specifications will be accepted by the carriers in official classification territory.

VEHICLE PARTS: TIRES, N. O. I. B. N.

Section 1. Single tires must be completely protected by machine one-third overlap wrapping in (a) waterproof paper having a resistance of not less than 60 pounds per square inch, Mullen test, or (b) crinkled waterproof paper having a resistance before crinkling of not less than 60 pounds per square inch. Mullen test.

Section 2. Bales or bundles of two or more tires, other than individually wrapped tires, must have wrapping overlap not less than one-third its width and bales and bundles must be protected (a) by completely wrapping in burlap, or (b) by overlap wrapping in waterproof paper having a resistance of not less than 100 pounds to the square inch, Mullen test, or (c) by overlap wrapping in crinkled waterproof paper having a resistance before crinkling of not less than 100 pounds per square inch, Mullen test, or (d) by overlap wrapping in two thicknesses of waterproof paper fastened together with a waterproof composition and reinforced with yarn or wire not more than one inch apart, the combined material having a resistance of not less than 60 pounds per square inch, Mullen test, or (e) by machine overlap wrapping with waterproof paper and cloth the combined material having a resistance of not less than 60 pounds per square inch, Mullen test, or (f) by machine overlap wrapping with waterproof paper having a resistance of not less than 60 pounds to the square inch, Mullen test, or (g) by machine overlap wrapping with crinkled waterproof paper having a resistance before crinkling of not less than 60 pounds per square inch, Mullen test.

Section 3. All bales or bundles must be securely tied in not less than three places with rope not less than ¼-inch in diameter, or three metal bands not less than U. S. Standard Gage No. 29, ½-inch in width, securely fastened and properly spaced.

RUBBER EXECUTIVES PREDICT EARLY BUSINESS RECOVERY

THAT THE RUBBER INDUSTRY is unquestionably on the up-grade once more, and that nothing short of a commercial cataclysm can check its steadily forward course, is the consensus of opinion of leading executives of five of the largest rubber manufacturing companies in Akron. The industrial captains interviewed are not of the class given to self-deception, and by reason of their large interests, keen business sense, extensive experience, and ample and intimate acquaintance with trade conditions, unusual interest attaches to their views.

It is pointed out that, aside from the stimulus to the tire trade expected from the gradual improvement in the industries and commerce of the country, a condition that cannot fail to redound soon and considerably to the advantage of tire manufacturers is that during the past six months tire consumption has outrun tire production. The bottom, it is claimed, was touched last December, when but 506,111 tires were manufactured. In the same month 350,071 tires were sold to manufacturers for original equipment, 977,082 to dealers for replacements, and 39,278 were exported. Comparing this total of 1,366,431 with the month's production of 506,111, there is a shortage of 860,320 tires. It is unthinkable, say the leaders in the industry, that a reaction from such a condition should not soon ensue, especially when the passenger cars and motor trucks of the country number at least 8,500,000, needing about 30,000,000 tires a year, or 2,500,000 a month. Prospective buyers' spares must soon give out, original equipment demands are growing, and stabilized prices will encourage early purchases.

W. A. Johnson, manager of pneumatic tire sales for The B. F. Goodrich Rubber Co., estimates that by May 1, production is bound to increase, and development from then on will be steady, but not phenomenal. The Goodrich company, which has been affected less by the business lull than probably any other company he says, sees better times in the early future for the rubber industry in general.

William F. Pfeiffer, secretary and treasurer of The Miller Rubber Co., says that his company is experiencing increased business in all its lines, some of them having almost returned to normal, and in a few cases even making a better showing than for the corresponding period in 1920. He regards the halting, conservative buying by dealers at this time as a favorable sign and as tending ultimately to help sound trade.

Harvey S. Firestone, president of the Firestone Tire & Rubber Co., says that while he does not look for a quick rebound from the recent depression, there will be, and there is now in progress, a real, though gradual improvement in nearly all lines. As indicating what tire makers may expect, he states that nearly all automobile makers report increasing business, one concern showing gains over the low point in December of from 50 to 250 per cent weekly.

William F. O'Neill, vice-president and general manager of The General Tire & Rubber Co., also figures on a marked change for the better by about May 1, and that soon after that date most of the Akron concerns will be making tires at a normal rate. Inasmuch as the price of rubber, he says, is not likely to go above 40 cents a pound for a long time to come it will make possible the production of hundreds of articles from rubber which hitherto have been made of other materials, and a wide field of endeavor opened up that will mean much to rubber mill-owners and operatives, and supplement the tire business which is daily improving.

W. C. Behotegny, manager of automobile tire sales for The Goodyear Tire & Rubber Co., says that no one in the trade expects an early repetition of the business experienced during the "peak" period a year ago, and that it may even be a few years before that condition repeats itself, but changes for the better are positively in progress. He estimates that by the middle of spring, dealers' business will be about 75 per cent normal and manufacturers' about 50 per cent. Owing to the extensive use of motor cars during the mild winter, tires have been largely consumed and for this reason alone, apart from generally improving business conditions, a noticeable change for the better in tire manufacturing can be predicted for the early spring, and there is even a possibility of an actual tire shortage.

RUBBER DEPRESSED IN BURMA

Labor is the main difficulty of the present depression in the tin and rubber markets of Burma. The tin miners are largely Chinese, but the rubber tappers are Tamils from India. If the depression is prolonged these laborers will have to be sent home as they cannot find employment in other industries. This will demoralize trained organizations, making it difficult to resume. There seems to have been overproduction for current needs in both tin and rubber, and prices are about half of what they were during the war. It is reported that the Government has asked banks not to accept rubber or tin shares as security even for small loans.

THE UNPRECEDENTED INCREASE IN THE PRICE OF RICE IN CEYLON has given rise to considerable discontent on the part of the laboring classes. By the end of 1919 the price had more than doubled, while there had been no perceptible increase in wages between 1914 and the end of 1919. The rubber estates have been adversely affected as they found it necessary to furnish rice to the laborers at a reduced cost—the only alternative to a general increase in wages. The rubber estates are said to have been well able to stand the increased cost of production, as net profits for 1919 ranged from 20 to 50 per cent.

The Rubber Trade in Great Britain

By Our Regular Correspondent

TRADE MATTERS continue in much the same humdrum condition. One or two firms have passed their dividends, and speculation is naturally rife as to what other shareholders will perforce have to suffer. The wage question has not yet become acute, but it rather looks as if the rubber trade will have to fall in line with other industries in a temporary reduction, even if the hands do not take the initiative, as has been done in other cases. According to Lord Inchcape, the banking and shipping magnate, the boom of a year ago was killed because nobody, either the Government, the manufacturer or the working man, appeared to bother about costs. A maximum wage, he added, was never too much to pay for a maximum output, but a maximum wage, coupled with a minimum output, irrespective of individual capacity, intelligence or industry, would inevitably lead to ruin. This utterance might well be pondered over by labor leaders.

A FEW FAVORABLE TENDENCIES

Manufacturers have hailed with satisfaction the announcement that the excess profits duty is shortly to come to an end, especially those firms which were founded after 1915 or have been largely developed since then. Another favorable point is the fall in price of coal. Owing to the stagnation of trade, there has been a large accumulation of the qualities used for steam raising. Cost control came to an end on March 31, and the trend of future prices is at present shrouded in obscurity. A good many of the chemicals used in the trade are now easier in price, foreign imports making themselves felt. Zinc oxide is billed as one of the key industries in the bill now before Parliament, and it will be interesting to see how much, if any, protection is to be given to the home production which is now of some magnitude. German ultramarine is now obtainable as of yore at a price much lower than that of the British article, and, moreover, almost entirely devoid of the free sulphur which proofers find so objectionable.

CAOUTCHOUCINE

This product of destructive distillation has never had more than scientific interest since the long past days—about 1860, I think—when Greville Williams fractionated various bodies from the oils yielded by the distillation of rubber. I did something myself a good many years ago, and prepared various distillation products as exhibits for one of our large exhibitions. I have read that oil of caoutchouc was suggested from a German source as an excellent rust preventive, but have no idea as to the extent it was used, if indeed it was used at all. The substance, however, has now come into notice again, as it has been proposed as a denaturant for alcohol to be used for power purposes. The Empire Motor Fuels Committee, which acts as a sort of link between the Department of Scientific and Industrial Research and the various manufacturers of motor cars, petrol and benzol companies, etc., has the matter in hand and arrangements have been made at the Royal College of Technology in London for a series of researches and tests on caoutchoucine and other suggested denaturants, such as bone oil. Qualitative and quantitative chemical tests are to be worked out, and a provisional specification for quality and testing is to be drawn up. If adopted as a denaturant, caoutchoucine will hardly be able to solve the surplus rubber problem, but still any new use has an interest at the present time.

ARTIFICIAL LEATHER

The high price and scarcity of leather have naturally given a fillip to the manufacture of the various leather substitutes. The position, however, has recently undergone a change owing to the fall in the price of leather. There is now no shortage of leather, the large holdings of the Government being gradually put upon the market. Leather boots are now very much down in price, although most of the better class shops are still holding out for prices which are really much too high. As far as my inquiries go the rubber firms specializing in rubber heels and composition soles are still working full time, forming an exception to the rubber trade generally.

An industry not, perhaps, very well known, but one in which orders not infrequently run to £10,000, is that of best leathers of boxcalf. During the period of leather scarcity and high price, large quantities of artificial leather of certain well-known brands were used, but now that the price has broken the tendency is to get back to real leather, and manufacturers regard dolefully the unused stocks of the substitutes in their warehouses. Leather substitutes not being raw material have shown no appreciable fall in price, though, no doubt, as certain of their ingredients get cheaper they will be able to follow the lead of leather to some extent. Meanwhile the low price of rubber has promoted the production of certain forms of decorative and upholstery material into which rubber enters to some extent, and these compounds are now in a better position to compete with the leather substitutes which consist solely of oxidized or nitrated oils.

INDIA RUBBER MANUFACTURERS' ASSOCIATION

At the annual meeting held at the end of January, Stuart A. Russell, of the India Rubber, Gutta Percha & Telegraph Works Co., Limited, was reelected chairman, and E. Healey, of W. & A. Bates, Limited, reelected vice-chairman. In addition to the better known names on the new general committee are D. C. Campbell, Campbell, Achnach & Co., Limited; Colonel Gardiner, the Rubber Co. of Scotland, Limited, and E. Hemsworth, the Ioco Rubber & Waterproof Co., Limited. Describing himself as not a pessimist, the chairman said he believed that if all concerned worked together in the way of reducing prices trade would revive, but he thought that for some time to come it would be found very difficult to get a market for their products at prices which would yield a reasonable profit, or indeed any profit at all unless the labor cost per unit of production was reduced and the burden of taxation lightened. The question of reducing the cost of production by improved methods of manufacture and greater production for a given wage would need the very careful attention of all the members in the present year, but he saw no reason why these problems should not be solved in a way which would enable their factories to be kept fully employed and the amount of unemployment be reduced to a low figure.

The question of giving support to the proposed rubber club came before the general committee, it is understood, a month or two ago, with the result that no expression of opinion for or against was given, it being held that the matter was one for each member to decide for himself. Another matter that has been discussed is the proposed new factory legislation with regard to the cold cure and use of lead compounds. Representations in the matter have been addressed to the Secretary of State by the association as a body and not by individual manufacturers. Such representations will doubtless have more weight than individual ones, but would it not have been better for the government authority to have put the matter before the Association as representative of the trade before proceeding to draw up its somewhat obscure regulations?

THE DUNLOP MEETING

Despite the fact that the meeting passed off fairly harmoniously, the value of the old shares fell some, afterwards to 10*s.* and the new, 22*s.* 6*d.* paid, to 2*s.* Sir Guy Granet, late general manager of the Midland Railway Co., and Sir A. W. Fait, the chartered accountant, have joined the board, while Sir H. McGowan and Sir Henry Dalziel, the old directors, will remain, with F. A. Szarvasy

as chairman. There appears to be a bank overdraft of over £4,000,000, and it is apparently intended to issue either 5 or 6,000,000 of debentures at what was rather euphemistically termed "a moderate rate of interest." As regards the American company, it will be necessary to provide further working capital to the amount probably of $14,000,000, out of which the existing bonds will be reduced, and the necessary additional working capital provided. It is incorrect to assume, as many have done, that the troubles of the Dunlop company are entirely due to the American enterprise, as assistance is also required to finance the British company's forward rubber and cotton commitments. There are now altogether twelve subsidiary companies, including the rubber plantations and cotton mills, the total capitalization exceeding £5,000,000. The cotton mills in Lancashire have only quite recently been finished and the recent sale of the Nile & Ross spinning mills by the Amalgamated Cotton Co., Limited, was due to the fact that they were no longer required.

With respect to the profits of the current year, the chairman assumed that sales will be reduced by about 45 per cent, as compared with last year, and that a simultaneous fall in selling prices will also occur. This somber forecast may, of course, be altered if the Government turns a willing ear to the appeal of the company to make applicable the duty of 33⅓ per cent on American tires imported in the United Kingdom. The value of tires from all sources imported in 1920 was £5,500,000, against £2,500,000 in 1919. It cannot be said that the meeting did much to rehabilitate the shares in public favor, the ordinary at the time of writing being quoted at 10*s.* and the new, issued at 30*s.* and 22*s.* 6*d.* paid, being 1*s.*

NEW USES FOR RUBBER

The result of the prize competition conducted by the Rubber Growers' Association is still awaited. Meanwhile only the further development of rubber roadway is heard of in London, which cannot be said to be at all novel. A recent patent application is for rubber-studded concrete to be used on railway platforms, staircases, etc., to prevent slipping. It is claimed that the additional cost of this type of pavement will be repaid by the increased life of the concrete.

FINANCIAL NOTES

The Greengate & Irwell Rubber Co., Limited, has declared a final dividend of 5 per cent on the ordinary shares, making 7½ per cent for 1920. £10,000 is put to reserve, and £17,681 carried forward. It will be recalled that this company is a recent amalgamation of I. Frankenburg & Sons, Limited, and the Irwell & Eastern Rubber Co., Limited, which have always had a close financial connection. The flotation was a very successful one in respect to applications from the public.

Vickers, Limited, shares have fallen to 11*s.* compared with almost 40*s.* reached at one time last year, and it is generally believed that in order to tide over the present period of depression a further issue of debentures will be necessary in the near future. The change over from government work to purely industrial work has unfortunately coincided with a period of labor disputes, contracted trade and the inability of foreign customers to pay their debts. It will be recalled that among the subsidiary companies controlled by Vickers are the Ioco Proofing & Rubber Co., Limited, and W. T. Glover & Co., Limited, cable maker, while the company is also closely connected with the American bakelite patents which are being exploited at another of the subsidiaries.

With regard to the bankruptcy proceedings in the case of British Rubber Manufacturers, Limited, the Committee of Inspection has accepted an offer by S. van den Bergh, one of the directors, to purchase the company's interest in the assets for a sum sufficient to pay all the expenses of the liquidation, and a dividend of 2*s.* 6*d.* on the pound sterling to the unsecured creditors. The liabilities are £82,062, against assets estimated at £45,160.

EUROPEAN RUBBER NOTES

FRANCE

THE SOCIÉTÉ CHIMIQUE DU CAOUTCHOUC has recently been formed at Paris, with head office at 9 rue d'Aguesseau, Paris, and warehouse and factories at 1 and 3 rue Henri-Murger at La Plaine-Saint-Denis, Seine. The company, which is capitalized at 1,700,000 francs, will manufacture and sell regenerated rubber, special chemical products, "Activit," an organic accelerator, and cloth for waterproofing and rubberizing, and will also prepare fabrics for clothing. The first administrators are Jacques Schwab, René Hermann and Gustave Bernstein, all of Paris.

Le Caoutchouc et la Gutta-Percha announces that Dr. W. C. Geer, of The B. F. Goodrich Co., Akron, Ohio, and Professor G. Stafford Whitby of the chemistry department of McGill University, Montreal, Canada, are among their new collaborators.

The Société Manufactures Françaises Réunies de Cuirs, Peausseries, Courroies et Caoutchouc has been formed at Paris. This new concern is the result of the fusion of two companies, Société Ulysse Roux et Cie., and Manufacture des Caoutchoucs de la Drôme. These two concerns have tanneries, belting factories, and a rubber factory at Romans (Drôme). The capital of this firm has been fixed at 10,000,000 francs.

GERMANY

On March 16 of this year, the commercial agreement made between Germany and Sweden on May 2, 1911, will come to an end, in accordance with a notice given to Germany by Sweden. Like many another country, Sweden is going through an economical crisis and the Government is anxious to curb imports from foreign countries by means of a new tariff.

It seems that Sweden has no intention of according to Germany most favored nation treatment in the new tariff. The low rate of the mark permits Germany to place goods on foreign markets at a lower price than that demanded by local manufacturers, and Swedish business men accuse Germany of dumping. The opinion in Germany seems to be that Sweden is more in need of the German market than Germany is of the Swedish market.

What is considered of more importance here is the clause in the Versailles peace treaty by which Alsace-Lorraine, now a part of France, will send certain quantities of goods, free of duty, into Germany, for a period of five years. The quantities are to be based on the average annual amounts of goods delivered to Germany by Alsace-Lorraine from 1911 to 1913. For the period January 11, 1921, to January 10, 1922, the quantities of rubber goods and rubber waste which must enter duty free, total 353,000 kilos (kilo = 2.2 pounds).

It is claimed in Germany that Alsace-Lorraine never sold such quantities of goods, raw, partly manufactured and manufactured, as are mentioned in the list given out by the French Government.

NEW FIRMS

Firma Georg Kaletsch, Obermenzing-München, representation and sale of rubber goods.

Westdeutsche Regenmantelfabriken Kattenburg & Co., Bocholt. Manufacture and sale of raincoats.

Kongo Gummi-Gesellschaft Chormann & Tornquist m. b. H., Hamburg. Sale of "Kongo" rubber soles and heels put on the market by Westdeutsche Gummi-Compagnie H. Chorman, Dusseldorf, all business connected therewith and sale of allied goods.

Erste Ostpreussische Koutschuk-und Metallstempelfabrik E. Erlatis, Königsberg, Prussia. Manufacture of rubber and metal stamps.

Gummi-Handelsgesellschaft "Liga" Baetzner & Co., Stuttgart.

Antonie Rustbacher, Vienna. Sale of rubber goods.

Katherina Breuer, Vienna. Dealer in rubber goods.

Oskar Bauer, Vienna. Dealer in rubber goods.

Herman Klose, Leipzig-Gohlis. Representation of rubber goods firms.

FOREIGN TARIFFS

CHILE

A new law of February 23, 1921, raises Chilean import duties 100 per cent on children's toy balls and toys of rubber. On balls the duty has been increased from 0.12-peso per kilo to .25-peso per kilo, while on rubber toys (item 1764) the increase is from 2.50 pesos to 5 pesos per kilo.

It is proposed that among other articles tires should be exempt from the increase in customs tariff rates for Chile.

POLAND

Ex Tariff No. 89, rubber driving belts, rubber hose, with or without fabric, with or without spring inside, without metal covering on the outside; rubber for packings and technical articles of rubber, not combined with fabric. A Polish order of November, 1920, provides that customs duties on the above articles may be paid in paper currency with an "agio" of 200 per cent, at the rate of three paper marks for each gold mark prescribed by the Customs Tariff.—*Board of Trade Journal.*

FINLAND

Licenses for rubber goods imported by Finland are no longer required, with the following exceptions.

Tariff No. 317

Tissues and other textile materials covered with rubber or stuck together with rubber solution or lining of rubber; also elastic textile goods, all kinds containing rubber threads—all these, of textile materials of pure or mixed silk.

Tariff No. 335

Braces, belts and garters, suspenders for clothing, sleeve holders and other similar articles, of pure or mixed silk materials.

Tariff No. 708

Wheels with rubber tires for vehicles except automobiles for carrying goods, automobiles and tired wheels therefor.

LUXEMBURG

A Grand Ducal decree of December 8, 1920, withdraws the restrictions, imposed in August, 1916, on the exportation of india rubber and india rubber wares from Luxemburg.

The Rubber Trade in the Far East

By Our Own Correspondent

MALAYA

PRELIMINARY FIGURES covering the trade of Malaya during 1920 indicate that the value of rubber exports amounted to approximately $145,000,000, United States currency. Below is an interesting table giving the production of rubber, the average price per pound and the value—in pounds sterling—from 1906. The figures for 1920 are estimated:

	Tons	Average Price per lb.	Total value £
1906	430	5/–	240,800
1907	885	4/6	446,040
1908	1,629	4/–	729,892
1909	3,340	7/–	2,618,560
1910	6,504	6/–	4,370,688
1911	11,500	4/–	5,172,000
1912	21,305	4/–	9,548,901
1913	35,352	3/–	11,872,224
1914	50,404	2/3	12,701,808
1915	70,214	2/6	19,180,215
1916	99,063	2/6	25,938,360
1917	130,000	2/–	28,991,182
1918	135,000	1/3	18,900,000
1919	176,000	2/–	39,324,000
*1920	180,000	1/6	30,240,000

*Estimated.

The highest price for rubber quoted at Singapore in 1920 was 114½ cents on February 5. The best price on December 22 was 30 cents.

It is agreed, says *The Straits Budget*, that the all-in cost of producing rubber here is about 1*s.* 2*d.* per pound. If the average cost of bringing an acre to maturity is taken as £80 (£1 equals $4.866 normally), and 15 per cent is accepted as a fair rate of interest on the capital, and 350 pounds is taken as an average yield per acre, a paying price will be 1*s.* 2*d.* plus 8*d.*; equal to 1*s.* 10*d.*, or 78½ cents, in Straits currency. Standard smoked sheet sold in Singapore recently at 28½ cents (Straits) per pound, which is 50 cents below a true paying price, and 21½ cents below actual cost of production.

These figures explain the gravity of the situation here. Rigid economy is the order of the day, but companies that have spent thousands in recruiting labor do not wish to discharge their coolies, for when the industry takes a favorable turn, difficulties in obtaining labor are anticipated. In spite of this, large numbers of coolies are being discharged and not a little fear is expressed at the probable results of letting loose numbers of coolies who are unable to maintain themselves. The question of European unemployed is also vexatious; however, it is understood that the Government will employ as many as possible, while outside efforts will be made to aid the others.

IMPORTANT MEETING AT KUALA LUMPUR

An important meeting of about 75 representatives of every planting interest of Malaya, was held at Kuala Lumpur, December 29. Certain proposals, which had previously been drawn up by a special committee, formed at the suggestion of the acting chief secretary of the Federated Malay States Government, were unanimously adopted. The main points in the scheme are:

Legislation to enforce restriction of collection or prohibition of exports from January 1, 1921, to June 30, 1921, by 50 per cent, no exemptions to be made in favor of small holdings.

Financial assistance for mature areas to be granted conditionally on cessation of all production for six months from the date on which the loan is granted. This aid not to exceed $3 per acre per month. No dividends to be declared until loans are repaid.

Government to start relief work for discharged estate labor.

General temporary reduction of wages is recommended.

No further areas of land to be alienated for rubber until statistics are available from which a reliable forecast of the future of the rubber industry can be formed.

Statistics carefully compiled in Singapore show that the world's stocks at the end of December, 1920, totaled 310,000 tons, of which 120,000 tons in America; 50,000 tons in London; 40,000 tons afloat (less than normal, owing to restricted output); 80,000 tons in the East (Singapore, 25,000 tons; Colombo, 5,000 tons; Netherlands Indies, 15,000 tons; estates, 35,000 tons); and about 20,000 tons in Europe, Japan, Canada, Australia, South America and Africa. Stocks at the end of 1919, when business was active, were estimated at 240,000 tons. Under present conditions of trade the normal stock for the world might be put at 175,000 tons. On this assumption the world stocks at the end of 1920 are 135,000 tons greater than they should be.

Considering that Malaya, with an estimated area of 1,600,000 acres (about half the world's planted acreage), produces 175,000 to 200,000 tons annually, which, together with what Ceylon, South India and Burma produce, brings the total percentage of plantation rubber produced in British territories to 75 per cent, while the Netherlands East Indies, with an annual output of about 85,000 to 90,000 tons, contributes 25 per cent, it would seem that control was an easy matter. However, the main difficulties here are ignorance of planting matters among directors in England and Holland, and lack of organization in Malaya. But now that Malayan planters have shown at the Kuala Lumpur meeting that they are capable of whole-hearted cooperation, it is possible that a sound organization will not be lacking in the future.

RUBBER PAVING IN SINGAPORE

Permission has been granted to the Municipal Engineer-in-Chief to try experiments in paving local roads with rubber.

The chief engineer considers that vulcanizing rubber to concrete piles would be much cheaper than vulcanizing to steel plates, as was done in Southwark, England.

NETHERLANDS EAST INDIES

The publication of the proposed additional taxes on various products, including rubber and tea, in the Netherlands East Indies has resulted in representatives of foreign capital sending in vigorous protests to the authorities. The British Chamber of Commerce for the Netherlands East Indies, the Rubber Growers' Association and many prominent rubber exporters have sent protests to the Netherlands House of Representatives. These latter companies, representing the foreign rubber interests in Sumatra, point out that the new taxes will make taxation in the Netherlands East Indies higher than in any other rubber producing centers; that the cost of production in Sumatra is already higher than in other rubber countries; and that the total taxation should not be higher than that of the world's chief rubber cultivating countries.

GENERAL SITUATION

Expenses are being reduced on rubber estates in the East Coast of Sumatra by the curtailment of staff and labor. It is learned that The Goodyear Tire & Rubber Co. has reduced the salaries of assistant planters by one-third. It is evident from local publications that the degree of distress in rubber producing circles is less in Sumatra than in Ceylon and Malaya.

The situation in Java seems to be fairly steady, as planters have not had to go to the expense of recruiting labor from neighboring lands. The island produces practically all the food the people—at least the natives—require, and consequently has not experienced the trouble about rice that Ceylon, Malaya and even parts of Sumatra have had. Perhaps the most important point in Java's favor is that it is not a land of one or two main products, like Malaya or, to a certain extent, Ceylon. To be sure, rubber is an important article in Java, but sugar, tobacco, coffee, tea, cocoa, oils (mineral and vegetable), quinine, spices, are all prominent in her export list.

Some years ago a hot debate was waged in the pages of the *Nederlandsch-Indisch Rubbertijdschrift* over the relative advantages and disadvantages of estates with single crops or with many crops. It would be interesting to know what the opinions on this subject are today.

At all events Java planters are trying more new crops and jute and palm oil are being seriously considered. In fact, we learn that the government's caoutchouc estate, at Langsa, which was about to be sold, will now be extended and partly planted with gutta percha and oil-palms.

RECIPROCITY WITH GERMANY

It is learned that Batavia brokers are proposing to establish an institute which will exchange crude rubber for the manufactured product of German rubber factories, as the Germans need rubber, but cannot buy much owing to the adverse rate of exchange.

NETHERLANDS INDIES' LONDON EXHIBIT

The Netherlands East Indies will be represented at the London rubber exhibition. The director of the government's Institute at Delft, Mr. van Rossem, has taken the leadership upon himself. The general experiment station of the Avros (East Coast of Sumatra Rubber Planters' Association) at Medan, will also cooperate. It is planned to send a fine exhibit relating to rubber and oil-palm culture. The Central Rubber Station will be represented by its director, Dr. de Vries. The exhibit from this station will concern preparation mainly. East Java will be represented by Messrs. Hartjens and Vollenhoven.

NETHERLANDS INDIES RUBBER PRODUCTION INCREASES

Since 1913 reports have shown a large and steady increase in the production of Dutch rubber planting companies. The figures in the following table cover the reports of companies having offices or connections in Amsterdam, the chief market for their product. The figures represent half kilos. One-half kilo equals 1.1 pounds.

Companies	1918	1919	1920
Algemeene Belgisch-Javasche Cultuur Maatschappij ....*half-kilos*	.....	539,866	497,050
Amsterdam Tapanoeli Rubber Cultuur Maatschappii	240,000	300,000	369,000
Batoe Sumatra Rubber-Mij	47,200	84,308	105,000
Belgisch-Nederlandsche Cultuur Maatschappij	719,848	812,788	773,550
Cultuur Mij. "Bujabang"	609,000	611,800	494,700
Cultuur Mij. Boekit Lawang	74,200	93,000	115,700
Cultuur Mij. "de Lamponga"	.....	212,161	248,994
Cultuur Mij. Salatri Plantations	34,788	66,873	84,816
Cultuur Mij. Soerowinangoen	135,800	259,500	301,700
Fransch-Nederl. Koloniale Cultuur Maatschappij	534,600	419,300	433,100
Oost-Borneo Maatschappij	76,257	71,636	102,850
Rubber Cultuur Maatschappij "Soengey Raja"	.....	219,621	233,662
Rubber Mij. "Basilam"	338,300	411,600	449,200
Rubber Maatschappij Tjibantjet	124,240	140,919	140,541
Sumatra Caoutchouc Mij	1,041,964	1,132,469	1,361,435
Tabak Mij. "Krapoh"	82,557	103,020	138,886
Zuid-Preanger Rubber Mij	323,493	378,201	411,416
Totals	4,382,247	5,857,062	6,261,600

RUBBER COMMERCE OF CEYLON, 1918-1919

Imports of raw rubber into Ceylon for the year 1919 were 4,644,507 pounds, valued $2,272,311, as against 5,507,346 pounds in 1918, valued $2,080,607. Exports of rubber during these years were 22,738 tons in 1918, valued $22,226,268, while in 1919 the quantity increased to 47,406 tons, valued $55,492,495. Although Ceylon's commerce in rubber is still controlled by the London market, about 66 per cent of the amount exported in 1919 went to the United States direct, 20,885,382 pounds, valued $7,536,326, being exported to the United States in 1918, and 71,386,377 pounds, valued $24,891,754 in 1919. The United Kingdom took 33 per cent and the remainder was distributed among other countries.

Approximately 45,000 long tons of rubber were exported during 1919, exceeding the 1918 exportation by about 120 per cent. The foreign demand was good for all grades during the year. Owing to restrictions on the importation of rubber into the United States during 1918, Canada became a direct importer of Ceylon rubber. In that year 2,500 long tons of rubber were shipped directly from Ceylon to Canadian ports. The exportation practically disappeared in 1919, as Canada again obtained her requirements from shipments originally destined to the United States.

THE RUBBER TRADE OF SIAM

According to declared values at the port of Bangkok, rubber goods imported into Siam in 1919-20 included 6,875 kilos of bicycle tires, valued 43,160 ticals (one tical equals $0.3709); 29,645 kilos of motor car tires, valued 253,839 ticals; 20,354 kilos of other tires, valued 54,262 ticals; and 27,224 kilos of other rubber goods, valued 170,030 ticals. In 1919-18 miscellaneous rubber goods led rubber imports into Siam, 32,069 kilos being imported, at a value of 207,724 ticals; motor car tires were second, with 31,011 kilos, valued 195,357 ticals; 7,159 kilos of bicycle tires, valued 39,246 ticals, were imported, and 42,735 kilos of other tires, valued 117,938 ticals. Both years show a considerable increase over the pre-war fiscal year 1913-14, when import figures were: Bicycle tires, 4,906 kilos, valued 34,934 ticals; motor car tires, 19,551 kilos, valued 129,928 ticals; other tires, 17,550 kilos, valued 51,320 ticals; and other rubber goods, 30,167 kilos, valued 106,812 ticals.

Rubber exports from Siam in 1919-20 were 61 short tons, valued 67,684 ticals, nearly twice the amount of 1919-18, which totaled 33 short tons, valued 30,212 ticals. In the pre-war fiscal year 1913-14, 103 short tons were exported, valued 90,355 ticals.

Imports of rubber goods from the United States into Siam have greatly increased from 1913-14, when the value of these imports was $741. In 1916-17 the value increased to $11,002; in 1917-18, $13,648; in 1918-19, $29,531. Figures for 1919-20 show a slight drop to $27,235.

BALATA IN BRITISH AND DUTCH GUIANA

BALATA growers and gatherers in British Guiana are awaiting with anxiety the report of the commission appointed by the Governor to consider the balata industry and to recommend, if need be, legislation that will promote its commercial success. Stringent regulations have long been in force about how and when the trees may be bled, but such government control has not helped much either to increase the output or to enhance the price. In fact, there is a general impression that the industry has been over-regulated, and that in view of the reduced output and the greater difficulty and cost of getting balata the bars must be let down somewhat, or the industry may soon face a real crisis. Regret is expressed, too, that the balata industry has not had the benefit of the great research work which has been carried on in connection with every phase of the rubber industry, although realizing that considerable scientific study of balata, as compared with rubber, has not been warranted because of the minor commercial importance of balata.

Some balata men even fear the extinction of the industry, at least in the Guianas, as they remark that there are but few, if any, uses for balata for which rubber may not be substituted. They are not encouraged even by the relatively good prices of 3*s.* 7½*d.* a pound in 1919, compared with 2*s.* 6*d.* a few years ago, for the cost of getting balata is increasing, with no relief in sight. Excess bleeding has practically exhausted the easily available supply, thus compelling the gatherers to go deeper into the forests to get at good bullet trees, all of which adds to the expense. The bushmen expect better pay than those working near the towns or settlements, and labor is short at best. The Government is none too sanguine about the outlook for balata, the chief forest industry, and which has yielded a large part of the public revenues. Officials fear that any considerable drop in the price will mean the doom of balata as a territorial product.

CONSOLIDATED RUBBER & BALATA ESTATES, LIMITED

At the recent annual meeting in London of the shareholders of the Consolidated Rubber & Balata Estates, Limited, which has large interests in British Guiana, the chairman reported that the directors had decided to pass the 1920 dividend, as was done in 1919, and to carry forward the surplus of £9,010. The company, it was stated, had been hit hard by the drought of the summer of 1918 and the spring of 1919, higher labor costs, increased freight rates, and a loss on exchange of £2,194. The company's balata turnover for 1917 was 1,088,498 pounds; in 1918, 891,841; and in 1919 but 621,268 pounds. From its Aruka plantation in the northwest district the company got but 4,073 pounds of rubber, the trees there as in all the low-lying plantations having suffered severely from the "die back" disease. Experts in the Lands Department frankly state it as their belief that British Guiana is not a suitable country for the cultivation of rubber. Some hope, however, is held out for fair results from the young trees planted on the higher levels.

A. F. White, since 1911 general manager at Demerara for the Consolidated Rubber & Balata Estates, Limited, has resigned on account of ill-health and gone back to England. His assistant, Mr. Tout, succeeds him.

BALATA IN DUTCH GUIANA

Somewhat better conditions in the balata industry are said to prevail in Dutch Guiana, although here, as in British Guiana, growers and gatherers are troubled with several adverse circumstances. The cost of getting balata is steadily mounting, owing largely to the fact that gatherers must go a longer way into the hinterland to find trees worth bleeding. The cost of transportation is getting higher, and this condition will get worse when the Government carries out its expressed intention of dismantling the railroad beyond a point located 150 kilometers from Paramaribo because it is losing money. The labor shortage, higher taxation, and unfavorable exchange also give much concern. However, most growers are content to wait for higher prices, and there is little talk of growing more marketable products, as in British Guiana.

According to Government statistics, the 1920 crop of balata was 287,747 kilograms. Of this amount the largest contribution was made by the Balata Company Suriname (founded by Henry Benjamins, styled the father of the balata industry in Dutch Guiana); and, while the company suffered quite a setback in 1920, it is still hopeful for the coming year. In 1918 the company paid 20 per cent dividend, but in 1919 not only was the dividend passed, but a loss of 42,000 florins was shown. A good turnover is expected for 1920, however, from balata purchased at low prices.

A large operator who has done fairly well during the year is A. F. C. Curiel, said to be financed by Middleton & Co., of New York. C. Kersten & Co., a concern said to be well intrenched financially and whose headquarters are in Germany, has also made a good showing for 1920, considering the many drawbacks with which the industry has been handicapped.

BRAZIL SUBSIDIZES THE RUBBER INDUSTRY

The Brazilian Ministry of Agriculture has been authorized to grant to rubber factories established in Brazil within three years from date, in which exclusively Brazilian rubber is employed, guaranteed interest of 6 per cent per annum on a capital of not less than 2.000:000$ or over 10.000:000$ for a period of three years in addition to favors granted in 1912. These rubber factories will be exempt from duties, and a premium of 200:000$ will be given to all those established within the three years stipulated.

The sum of 3.000:000$ is to be disbursed for the transport of agricultural laborers from Europe to any Brazilian state, the receiving state paying half the expenses. Furthermore, 370:000$ are to be expended on the Brazilian representation at the rubber exhibition which will take place this year in London.

An agreement will be entered into with rubber producing states of the Union to reduce annually the export tax on rubber to a parity of that charged from the Acre Territory. Rubber machinery for use in local factories will be allowed to enter the country free of duty and last, but not least, an expert is to be sent to study the cultivation of rubber in the East.

The Brazilian budget for 1921 further provides that all exemptions and reductions of customs duties be abolished except for material contracted for by the government and machinery and instruments for agriculture, mining and cattle raising industries.

BRAZIL'S CENTENNIAL

Considerable interest is being taken by the rubber industry in the preparations being made for the celebration by Brazil on September 7, 1922, of its hundred years' existence as a nation. Plans will soon be formulated for cooperation in the United States with the American Chamber of Commerce for Brazil in raising a fund of $500,000 for a suitable memorial at Rio de Janeiro to symbolize the friendship of the United States for its esteemed sister republic, the greatest of all South American countries, its population being greater than all Latin-America combined; with 5,000 miles of coast line and an area 200,000 square miles larger than the United States, yet mostly undeveloped. With its government and many of its institutions patterned after those of the United States and importing from this country more than half of its necessities and luxuries, while sending back half of its surplus products, Brazil has long entertained for the United States a feeling of fellowship equalled by few other nations. As one evidence of such regard is noted the sending of the Brazilian fleet after our own into the North Sea during the World War.

Recent Patents Relating to Rubber

THE UNITED STATES

GRANTED FEBRUARY 1, 1921

NO. 1,366,897 Abdominal supporter with elastic straps. I. N. Beery, Jr., Harrisonburg, Va.
1,366,963 Tire valve. M. C. Schweinert, West Hoboken, and H. P. Kraft, Ridgewood—both in N. J.
1,367,011 Resilient tire. R. B. Bostwick, Duquesne, Pa.
1,367,084 Dust cap for inflating valve stems. E. M. Overbey, Creighton, Mo.
1,367,225 Inflatable life belt. W. H. Barker, New Brighton, assignor to C. W. Wright, New York City—both in N. Y.
1,367,255 Fountain pen. H. S. Hasselquist, Chicago, Ill., assignor by mesne assignments to The Wahl Co., Wilmington, Del.
1,367,395 Demountable rim for tires. E. E. Jameson and T. Kameron, assignors of one-third to E. Jones, all of Schlater, Miss.
1,367,436 Hydrometer. L. J. Stern, Boston, Mass.
1,367,474 Garter. J. A. Hewes, Melrose, Mass.
1,367,490 Automatic alarm for partially deflated tires. A. J. Michelin, Paris, France.
1,367,495 Hydrometer syringe. E. Neerup, Chicago, Ill.

GRANTED FEBRUARY 8, 1921

1,367,544 Body treatment machine with series of rollers. J. P. Gardner, Chicago, Ill.
1,367,630 Rack for chemicals and other purposes with rubber-lined receptacles. M. Mendel, New York City.
1,367,624 Fountain pen. A. L. Ogden, New York City.
1,367,746 Ear shield. W. J. Kent, Brooklyn, N. Y., assignor to The Mechanical Rubber Co., a New Jersey corporation.
1,367,747 Bath brush. G. B. Keplinger, Chicago, Ill.
1,367,751 Bias-woven selvage-edge fabric. H. I. Morris, assignor to The Savage Tire Co.—both of San Diego, Calif.
1,367,758 Fountain sponge, G. F. Strieff, Watertown, N. Y.
1,367,815 Tire valve. R. H. Henemier, New York City, assignor to A. Schrader's Son, Inc., Brooklyn—both in N. Y.
1,367,826 Tire valve or the like. E. V. Myers, East Orange, N. J., assignor to A. Schrader's Son, Inc., Brooklyn, N. Y.
1,367,994 Vehicle tire. E. Sterns, St. Louis, Mo., assignor by mesne assignments to Surety Tire & Rubber Co., Wilmington, Del.
1,367,995 Vehicle tire. E. Sterns, St. Louis, Mo., assignor by mesne assignments to Surety Tire & Rubber Co., Wilmington, Del.
1,368,025 Electrical insulating tape. H. I. Diamond, Atlanta, Ga.
1,368,063 Inner tube for tires. C. S. Sights, La Harpe, Ill.
1,368,068 Hose coupling. L. Stein, New York City, and L. Brumer, Brooklyn—both in N. Y.
1,368,093 Hard rubber separator for store battery plates, having soft rubber strips vulcanized on each face. J. M. Allen, assignor to J. M. Allen, F. P. Smith and F. D. Tucker, trustees for The Smith-Allen Battery Co.—all of St. Louis, Mo.
1,368,199 Automobile wheel with resilient sectional tire having overlapping rubber casing. G. W. Sell, Portland, Ore.

GRANTED FEBRUARY 15, 1921

1,368,235 Demountable split rim for tires. W. N. Booth, assignor to Kelsey Wheel Co., Inc.—both of Detroit, Mich.
1,368,254 Resuscitator. A. N. Habberly, Melrose, Mass.
1,368,304 Tire construction. A. C. Terrell, Kansas City, Mo.
1,368,307 Earpiece with walls of sponge rubber. F. D. Waldron, Brooklyn, assignor to Western Electric Co., Inc., New York City—both in N. Y.
1,368,401 Game apparatus. H. E. Kettle, Hamilton, Ont., Can.
1,368,419 Demountable rim for tires. E. K. Baker, assignor to Universal Rim Co.—both in Chicago, Ill.
1,368,498 Flutter valve tester. R. M. Graham, Sidney, O.
1,368,511 Combined tire test-gage and valve. K. F. Lees, New Haven, Conn.
1,368,512 Tire test-gage and valve. K. F. Lees, New Haven, Conn.
1,368,513 Combined tire valve and gage. K. F. Lees, New Haven, Conn.
1,368,566 Inflatable belt. T. J. McNeary, New York City.
1,368,642 Clip for bead-wires. T. Midgley, Springfield, assignor to The Fisk Rubber Co., Chicopee Falls—both in Mass.
1,368,723 Valve cap. G. O. Helvig, Dawson, Minn.
1,368,782 Massage vibrator. C. H. Beach, Racine, Wis., assignor to Moore Electric Corporation, Chicago, Ill.
1,368,835 Raincoat. C. H. Place, New Rochelle, assignor to New York Mackintosh Clothing Co., New York City—both in N. Y.
1,368,864 Hat protector. E. Turner, Chicago, Ill.
1,368,895 Ear protector. L. Cenerini, Bristol, R. I.
1,368,902 Detachable rubber heel. L. Cuvelier, Halifax, Nova Scotia, Can.
1,368,937 Inflatable device for use in learning to swim. G. Jordahn, Palm Beach, Fla.
1,368,982 Windshield cleaner. A. B. Beitman, East Cleveland, assignor to The Outlook Co., Cleveland—both in O.

GRANTED FEBRUARY 22, 1921

1,369,139 Parachute and safety belt. L. B. Sperry, Massapequa, N. Y.
1,369,181 Cushion wheel. J. Mitrosky and J. Bogdan, Perth Amboy, N. J.: said Mitrosky assignor to said Bogdan.
1,369,184 Fountain pen. R. E. Perkins, Joplin, Mo.
1,369,185 Fountain pen. R. E. Perkins, Joplin, Mo.
1,369,257 Inner tube for pneumatic tires. T. O. Markell, Cleveland, O.
1,369,273 Cord for tires. A. P. Eves, Chicago, Ill.
1,369,389 Rubber spring. G. I. Browne, Lancaster, Pa.
1,369,394 Cushion tire. J. C. Busche, Highland Park, Mich.
1,369,395 Parachute. E. R. Calthrop, assignor to E. R. Calthrop's Aerial Patents Ltd., both of London, Eng.
1,369,410 Blow-out patch and holder therefor. C. L. Durham, Kansas City, Mo.
1,369,529 Detachable heel. W. A. Maloney, Needham, Mass.
1,369,549 Tire core binder. E. G. Rupert, assignor of one-half to D. W. Rupert, both of Trenton, N. J.
1,369,584 Demountable rim for tires. W. S. White, Chattancoga, Tenn.
1,369,631 Nasal guard. T. A. De Vilbiss, assignor to The De Vilbiss Manufacturing Co.—both of Toledo, O.
1,369,669 Wearing apparel for diving and swimming. M. Kamenos, Washington, D. C.
1,369,725 Electrical tire signaling device. F. Bergier, Manhattan, Kans.
1,369,755 Hose clamp. W. T. Rutledge, Santa Ana, Calif.

THE DOMINION OF CANADA

GRANTED FEBRUARY 1, 1921

208,054 Inner tube. J. M. Dirienzo and J. A. Dirienzo, coinventors—both of Madison, Wisc., U. S. A.
208,067 Waterproof garment. B. A. Bittan, Philadelphia, Pa., U. S. A.
208,126 Game ball. R. H. Hazeltine, New York City, U. S. A.
208,167 Dirigible balloon. J. F. O'Grady, Sisseton, S. Dak., U. S. A.
208,185 Resilient tire. J. B. D. Sicotte, Montreal, Que.
208,201 Reliner for pneumatic tires. A. E. Wolter, Everett, Wash., U. S. A.

GRANTED FEBRUARY 8, 1921

208,407 Endless belt. The Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, assignee of The Goodyear Tire & Rubber Co. of Canada, Ltd., Toronto, assignee of A. M. Hardy, Bowmanville—all of Ontario.
208,408 Balloon valve. The Goodyear Tire & Rubber Co., assignee of R. H. Upson—both of Akron, Ohio, U. S. A.
208,421 Milking machine teat cup. The Ridd Co., Ltd., assignee of A. Ridd—both of New Plymouth, New Zealand.
208,424 Air bag. The Smith One Heat System, assignee of C. L. Smith, and E. S. Webster, coinventors—all of South Bend, Ind., U. S. A.

GRANTED FEBRUARY 15, 1921

208,555 Ventilated Garment. H. Siegel, Chicago, Ill., U. S. A.
208,582 Parachute. The E. R. Calthrop's Aerial Patent, Ltd., assignee of E. R. Calthrop—both of London, Middlesex, Eng.

GRANTED FEBRUARY 22, 1921

208,627 Driving belt or chain with rubber-covered links. J. H. Smith, London; R. H. Brand, Ascot, Co. of Berkshire—both in Eng., and T. G. Leith, Oyne, Aberdeen, Scotland, coinventors.
208,646 Combination pneumatic tire. R. Blakoe, London, W. I., Eng.
208,663 Portable urinal with inflated cushioned opening and having removable stopper. C. E. Davies, Lethbridge, Alta.
208,713 Shim plate for demountable tire rims. H. J. Hick, Alliance, Ohio, U. S. A.
208,730 Elastic garment supporter. C. W. Kinsman, Northfield, Vt., U. S. A.
208,742 Diaper with waterproof shield. C. LeMoine, Sioux City, Iowa, U. S. A.
208,777 Cushion tire rim. E. T. Phelan, Jackson, Mich., U. S. A.
208,813 Brassière with elastic belt and shoulder straps. Z. Wardalla, London, W., England.
208,891 Inner tube. Z. Kornis and T. E. Pride, assignee of a half interest—both of Decatur, Ala., U. S. A.

THE UNITED KINGDOM

PUBLISHED JANUARY 12, 1921

152,991 Balloon valve. The Goodyear Tire & Rubber Co., assignee of A. G. Maranville, 103 Russell avenue—both of Akron, Ohio, U. S. A. (Not yet accepted.)
153,039 Rubber heel with revoluble portion contained in metal cup which nails to heel seat. E. L. Robertson, 344 West 59th street, New York City, U. S. A.
153,150 Rubber-covered spring tire. A. Chambers, 110 New Road, Copnor, Portsmouth.
153,311 Balloon valves. Luftfahrzeugbau Schutte-Lanz, Reinau, Mannheim, Germany. (Not yet accepted.)
153,328 Teat cups for milking machines. W. F. Turk and S. Nielsen, Bowen street, Brisbane, Australia. (Not yet accepted.)
153,422 Apparatus for detecting and closing punctures in tires. Dunlop Rubber Co., 1 Albany street, Regent's Park, London, and J. Parker, 47 Shildon street, Darlington.
153,441 Pneumatic tire filled with inflatable rubber balls, each with automatic valve. W. H. Richards, Knoxville, Tenn., U. S. A.

PUBLISHED JANUARY 19, 1921

153,461 Tire liner for repairing pneumatic tires, made from worn tire cover. W. H. A. Theed, Alveston Motor Garage, Roland Gardens, South Kensington, and A. T. Phillips, 7 Bothwell street, Lillie Road, Hammersmith—both in London.
153,474 Rubber protectors for soles and heels. W. B. Ferguson, 9 Cyprus Park, Bloomfield, Belfast.
153,508 Tire rim. J. Donkin, 5 Pembroke Square, Kensington, London.
153,517 Tire with rubber core having annular recesses at sides. M. E. Baxter, 116 West Fifth street, East Liverpool, Ohio, U. S. A.
153,763 Tire with internal helical ribs and continuous circumferential ribs. A. Witzel, Ludwigsburg, Wurttemburg, Germany.
153,801 Tire tread. C. Wright and Racine Auto Tire Co., 1215 State street, Racine, Wisc., U. S. A.
153,849 Powder-puff formed of two portions coated with rubber and pressed together while the rubber is still plastic, etc. A. S. Mosheim, 81 Harrison street, East Orange, New Jersey, U. S. A.
153,901 Fountain pen. R. Bosch, Aktien-Gesellschaft., 4 Militärstrasse, Stuttgart, Germany. (Not yet accepted.)
153,902 Fountain pen. R. Bosch Aktien-Gesellschaft., 4 Militärstrasse, Stuttgart, Germany. (Not yet accepted.)

PUBLISHED JANUARY 26, 1921

154,032 Garters. C. S. Bisson, 32 New street, Jersey, Channel Islands.
154,081 Curved rubber tip for heels. W. F. Cowle, 156 York Road, Bedminster, Bristol.
154,085 Rubber sole protectors. W. Willoughby, 9 George's avenue, Blackrock, Co. Dublin.
154,206 Cord fabric tire construction. F. S. Dickinson, New York City, and J. Springer, Atlantic Highlands, N. J.—both in U. S. A. (Not yet accepted.)

Chemical Patents will be found on page 497. Machinery Patents on pages 501-502.

154,435 Demountable split rim for tires. C. W. Shaeffer, 140 N. Dearborn street, Chicago, Illinois, U. S. A.
154,485 Glove with elastic strap across front of wrist and elastic gusset near the thumb to hold flap covering an opening across the palm, for extruding the fingers. J. W. Lynn, 2 Hatherly Place, Lansdoune, Cheltenham, Gloucestershire.

PUBLISHED FEBRUARY 2, 1921

154,525 Tire inflater with rubber gland to push over tire valve. R. S. Burn, The Poplars, Wylde Green, Birmingham.
154,556 Fountain pen. Klio-Werk Gesellschaft, Hennef-on-Sieg, Germany. (Not yet accepted.)
154,578 Dirigible balloon with separate compartments for air and gas and inflatable ballonets. Goodyear Tire & Rubber Co., 1144 East Market street, assignees of R. H. Upson, 219 Shawnee Path—both of Akron, Ohio, U. S. A. (Not yet accepted.)
154,710 Rubber-coated endless conveyor for window displays. E. A. Dieterich, 910 Cauldwell ave., Bronx, New York, U. S. A.
154,712 Fountain pen. S. Leonard, The Cabin, Riverview Gardens, Strawberry Hill, London.
154,753 Tire comprising one or more solid rubber treads with integral side flaps forming covers for pneumatic tubes or sponge rubber fillers. J. B. Moore, 151 Park avenue, Wibsey, Bradford.
154,769 Wheel tires with segmental air tubes each fitted with combined valve and security bolt. A. H. Mann, Cairncroft, Devercourt Road, East Dulwich, London.
154,917 Fountain pen. A. Bergmann and W. Schmidtmann, Carthausen, Westphalia, Germany. (Not yet accepted.)
154,919 Leather cover with anti-skid tread for pneumatic tires. P. Alvermann, 8 Viktoriastrasse, Dortmund, Germany. (Not yet accepted.)
154,987 Sock-suspender with parts of vulcanite and elastic. A. E. Clauson, P. O. Box 81, East London, South Africa.

PUBLISHED FEBRUARY 9, 1921

155,070 Reinforced inner tube. R. Surridge, 58 George street, Camberwell, London.
155,079 Maternity corsets with elastic inserts and shoulder straps. L. A. C. Robertson and W. B. Robertson & Co., 6 King street, Glasgow.
155,148 Rubber sleeve for electric insulation. J. B. Hamilton, 1110 Park avenue, Hoboken, New Jersey, U. S. A. (See THE INDIA RUBBER WORLD, May 1, 1920, page 366.)
155,185 Golf tee. M. E. Morgan, Le Brees, Mayals Blackpill, Swansea.

GERMANY

PATENTS ISSUED, WITH DATES OF ISSUE

333,276 (November 1, 1919.) Valve for pumps and compressors with blast-pipe-shaped lock brim of rubber or similar material. Kurt Schoene, Adolphstrasse 74, Hamburg.
333,280 (May 1, 1919.) Resilient tire, Richard Bohe, Weinmeisterstrasse 12, Berlin.
333,433 (April 24, 1918.) Pneumatic tire. Naamlooze Vennootschap Berendonck's Syndicaat voor Banden, Deelen, Holland. Represented by Hans Heimann, Berlin.
332,847 (October 24, 1919.) Elastic heel. Johannes Mordhorst, Massmannstrasse 17, Kiel.
335,049 (January 10, 1920.) Tire with elastic insert. Leonhard Sauemheimer, Kloster, Heilsbronn, Mittelfranken.

TRADE MARKS

THE UNITED STATES

SERIAL NUMBERS PUBLISHED FEBRUARY 4, 1921*

NO. 125,802 The words RED CLOVER CHEWING GUM accompanying the representation of a group of clover leaves and blossoms with bees above—chewing gum. F. R. Perkins, Chicago.
128,396 MASTER CORD—tires. The Master Tire & Rubber Co., Dayton, O.
128,439 Representation of an electric device held by a hand, the cord enclosing the word Portable, and accompanied by the name R. G. HASKINS in white letters against a black rectangular background—portable machinery, including buffers, die filing equipment, flexible shafts, etc. R. G. Haskins Co., Chicago.
131,652 RUSCO—suspenders, hose supporters, garters, elastic braids, cords, belts and beltings, baseball and cadet webs, etc. The Russell Manufacturing Co., Middletown, Conn.
138,740 A three-pointed shield with rounded sides, bearing a monogram composed of the letters "AA"—rubber-covered wire for electrical use. A A Wire Co., Inc., Newark, N. J.
138,821 Representation of a tire through which is thrust a hand wearing a rubber glove and holding an instrument—rubber sponges. The Miller Rubber Co., Akron, O.
140,765—DU PONT FABRIKOID within an outline oval—imitation or artificial leather. Du Pont Fabrikoid Co., Wilmington, Del.

SERIAL NUMBERS PUBLISHED FEBRUARY 10, 1921*

135,064 RUSCO—tire tapes, auto-top webs, and elastic webbings. The Russell Manufacturing Co., Middletown, Conn.
135,067 RUSCO PRODUCTS within a rectangle accompanied by the representation of a parrot perched on a ring and the words They Speak for Themselves—tire tapes, auto-top webs, webbings, etc. The Russell Manufacturing Co., Middletown, Conn.
135,554 CLIPPER—golf balls. Dunlop America Limited, Buffalo, N. Y.
137,939 MICHIGAN SHOEMAKERS on a pendant hanging from Maltese cross which in turn bears the words WOLVERINE GLOVE & SHOE FROM HIDE TO YOU and the head of a wolverine—shoes of leather, rubber, and fabric and of combinations of these; also gloves of leather, rubber, and fabric. Hirth Krause Co., Rockford, Ill.
139,360—TIRE DEALERS NEWS on representation of a scroll across a tire—monthly trade publication. Monroe Tire Corporation, Chicago.
139,361 TIRE DEALERS NEWS—monthly trade publication. Monroe Tire Corporation, Chicago.
139,652 TIREGRAM—monthly periodical. The Gardner, Moffat Co., Inc., New York.

SERIAL NUMBERS PUBLISHED FEBRUARY 17, 1921*

127,693 Conventional design composed of a keystone superimposed on a white disk against a 14-pointed sun—elastic surgical hosiery, surgeons' operating rubber gloves, etc. Keystone Surgical Supply Co., Conshohocken, Pa.
132,561 LAUREL—elastic webbings. The Russell Manufacturing Co., Middletown, Conn.
135,068 The words RUSCO PRODUCTS within a rectangle accompanied by the representation of a parrot perched on a ring and the words They Speak for Themselves—woven beltings, asbestos brake linings, etc. The Russell Manufacturing Co., Middletown, Conn.
137,080 The word FULLER in white letters on a black oval outlined by extension of strokes of the letter F—holding racks for rubber tubes, bath brushes, etc. The Fuller Brush Co., Hartford, Conn.
138,603 TIREX—insulated wire and insulating materials. Simplex Wire & Cable Co., Boston, Mass.
139,797 THE SLIDO GARTER—garters. C. J. Hausen, New York.
140,175 The words GOOD YEAR within a double-outlined rectangle having ornamental geometric figures arranged at the ends—automobiles and motor trucks. The Goodyear Tire & Rubber Co., Akron, O.
141,062 NAVAJO—tire patches. Conrad Wilkey & Co., Casper, Wyo.
141,212 PARAGON—garters. Crescent Garter Co., New York.

SERIAL NUMBERS PUBLISHED MARCH 1, 1921*

130,091 Representation of the bust of Pericles, Prince of Tyre—rubber or gutta percha tires for automobiles, motorcycles, or bicycles. The Dunlop Rubber Co., Limited, London, Eng.
133,328 CAREY—asbestos and asbestos and rubber textiles, for waterproofing, etc. The Philip Carey Manufacturing Co., Lockland, O.
137,945 The word LEE within an enclosure having an arrowhead at each end—pneumatic tires. Lee Tire & Rubber Co., Whitemarsh Township, Montgomery County, Pa.
139,256 ARCH BELT—men's, women's and children's boots and shoes of leather, rubber, or fabric construction. The Emerson Shoe Co., Rockland, Mass.
141,902 THE TIRE NEWS—monthly periodical. The Goodyear Tire & Rubber Co., Akron, O.

GRANTED FEBRUARY 1, 1921

Under Act of February 20, 1905†

139,236 ALLIGATOR—tire patches. Alligator Grip Co., Dallas, Tex.
139,248 MERLIN—tires and tubes. The Batavia Rubber Co., Batavia, N. Y.
139,250 STEAM CURED and spray of thistles—dress shields. J. J. Beyerle Manufacturing Co., New York.
139,265 THE CAVALIER—hose supporters. R. J. Cavalier, Oswego, N. Y.
139,306 ANTELOPE—rubber and fabric hose. The B. F. Goodrich Co., New York.
139,307 DIRUBCO—rubberized fabric hose and belting. The B. F. Goodrich Co., New York.
139,308 ELK—hose and pump valves. The B. F. Goodrich Co., New York.
139,309 LYNX—fabric and rubber belts. The B. F. Goodrich Co., New York.
139,364 O'N—tires and inner tubes. The Owen Tire & Rubber Co., Cleveland, O.
139,402 HICKORY—garters and hose supporters. A. Stein & Co., Chicago.
139,403 DR. PARKER'S WAIST AND GARTERS—combined waist and garters. A. Stein & Co., Chicago.
139,419 MONOTWIN—solid tires. United States Tire Co., New York.
139,424 WS and a shield—tires, tubes, tire-boots and patches. Washington Tire & Rubber Co., Spokane, Wash.
139,432 Conventionalized star design—elastics, etc. George Williams Co., New York.
139,436 KNO-BIND—garters. D. M. Wirth, Bucyrus, O.

Under Act of March 19, 1920, Section 1 (b)†

139,440 ADAMS SPEARMINT—chewing gum. American Chicle Co., New York.
139,442 WHISTLER—tire valve. Automatic Safety Tire Valve Corporation, New York.

GRANTED FEBRUARY 8, 1921

Under Act of February 20, 1905†

139,480 LOX-ON—tire valves. Automatic Safety Tire Valve Corporation, New York.
139,515 RHINO—golf balls. Cupples Company Manufacturers, St. Louis, Mo.
139,648 TIROMETER—tire and tube valve and gage combined. Tirometer Valve Corporation of America, Charleston, W. Va.

GRANTED FEBRUARY 15, 1921

Under Act of February 20, 1905†

139,717 HABIRSHAW—electric cable. Habirshaw Electric Cable Co., Inc., New York.

Under Act of March 19, 1920, Section 1 (b)†

139,736 Representation of a label lettered in white against a dark background as follows: THIS TUBE HERMETICALLY SEALED BY STEAM. GUARANTEED NEVER TO LEAK.—Inner tubes. Dural Rubber Corporation, Flemington, N. J.

GRANTED FEBRUARY 22, 1921

Under Act of February 20, 1905†

139,823 SANITAL—belting, hose and packing. Imperial Belting Co., Chicago.
139,876 RE-NU-R—leather and rubber fabric dressing. George W. Roth, Minneapolis, Minn.
139,879 SANDERSOLED—retreaded rubber and fabric tires. D. A. Sanders, Nyack, N. Y.
139,886 SKOGUM—rubber fruit-jar rings. Smalley, Kivlan & Onthank, Boston.
139,904 LAX-GUM—chewing gum. Triangle Laboratories Co., Marion, O.
139,907 VULCA-PATCH—self-vulcanizing tire patch. Vulca Laboratories.
139,914 WINNER—heel plates for rubber heels, etc. Winner Manufacturing Co., Rochester, N. Y.

Under Act of March 19, 1920, Section 1 (b)

139,953 RACINE—tires. Racine Rubber Co., Racine, Wis.

*Notice of opposition must be filed with the Commissioner of Patents, Washington, D. C., within thirty days after this date.
†See THE INDIA RUBBER WORLD, February 1, 1921, page 576, "Two Kinds of Trade Marks Now Being Registered."

THE DOMINION OF CANADA
REGISTERED

27,907 BOSTON GARTER—garters. George Frost Co., Boston, Mass., U. S. A.

27,914 GOOD LUCK—rubber jar-rings. Boston Woven Hose & Rubber Co., Cambridge, Mass., U. S. A. (See THE INDIA RUBBER WORLD August 1, 1919, page 638.)

27,942 RUBBADUBDUB—rubber toys. J. G. Franklin & Sons, Limited, 17 Colverstone Crescent, Dalston, London, E. 8, England. (See description elsewhere in this issue.)

27,974 ERROR-NO—copyholders with rubber rollers and rubber foot. Error-No. Inc., Rochester, New York, U. S. A. (See description elsewhere in this issue.)

27,981 EBERHARD FABER as facsimile signature displayed on yellow panel showing diamond-shaped figure enclosing a star, and the words Eberhard Faber New York Oldest Pencil Factory in America—rubber erasers, rubber bands, pencils, etc. Eberhard Faber, New York, U. S. A.

27,998 Patte cross design—respirators, masks, hoods, etc. American La France Fire Engine Co., Inc., Elmira, New York, U. S. A.

DESIGNS
THE UNITED STATES

NO. 57,032 Rubber heel. Patented February 1, 1921. Term 14 years. G. W. Bulley, St. Joseph, Mich.

57,040 Tire tread. Patented February 1, 1921. Term 3½ years. E. C. Gordon, New York.

57,059 Non-skid tire tread. Patented February 1, 1921. Term 14 years. R. Muir, assignor to Hood Rubber Co.—both of Watertown, Mass.

57,065 Tire tread. Patented February 1, 1921. Term 14 years. F. Trautwein, Freeport, assignor to Trautwein Corporation, Brooklyn—both in New York.

57,070 Tire. Patented February 8, 1921. Term 14 years. E. P. Altenburg, Columbiana, O.

57,071 Tire. Patented February 8, 1921. Term 14 years. M. J. Atkinson, Mimico, Ont., Can.

57,072 Tire. Patented February 8, 1921. Term 14 years. A. L. Breitenstein, Akron, assignor to Rubber Products Co., Barberton—both in Ohio.

57,073 Tire. Patented February 8, 1921. Term 7 years. W. Dunbar, assignor to Allen Tire & Rubber Co., Allentown—both in Pennsylvania.

57,077 Tire tread. Patented February 8, 1921. Term 3½ years. F. E. Holcomb, assignor to The Williams Foundry & Machine Co.—both of Akron, O.

57,079 Tire tread. Patented February 8, 1921. Term 14 years. W. E. McCormish, Akron, assignor to The American Tire Corporation, Cleveland—both in Ohio.

57,116 Tire. Patented February 22, 1921. Term 14 years. C. H. Desautels, Springfield, assignor to The Fisk Rubber Co., Chicopee Falls—both in Massachusetts.

57,118 Non-skid tire. Patented February 22, 1921. Term 14 years. W. E. Duersten, New Castle, Pa.

57,120 Tire. Patented February 22, 1921. Term 14 years. A. C. Fisher, Butler, assignor to Corona Cord Tire Co., East Butler—both in Pennsylvania.

57,122 Tire. Patented February 22, 1921. Term 14 years. H. A. Githens, Milwaukee, Wis.

57,123 Tire. Patented February 22, 1921. Term 14 years. H. A. Githens, Milwaukee, Wis.

57,124 Tire. Patented February 22, 1921. Term 14 years. H. A. Githens, Milwaukee, Wis.

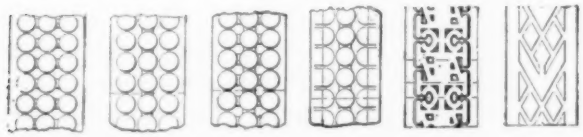
57,125 Tire. Patented February 22, 1921. Term 14 years. H. A. Githens, Milwaukee, Wis.

57,065 57,059 57,118 57,071 57,040 57,131 57,136 57,120 57,073 57,072 57,138 57,077 57,070

57,131 Tire. Patented February 22, 1921. Term 14 years. J. T. Johnson, Akron, assignor to The Portage Rubber Co., Barberton—both in Ohio.

57,136 Tire. Patented February 22, 1921. Term 14 years. H. M. Lambert, Portland, Oreg.

57,138 Tire. Patented February 22, 1921. Term 7 years. E. L. Lawlor, Youngstown, O.



57,122 57,123 57,124 57,125 57,079 57,116

57,150 Rubber heel. Patented February 22, 1921. Term 14 years. W. A. Ream, Morgantown, W. Va.

57,151 Toy balloon. Patented February 22, 1921. Term 14 years. E. T. Richert, Canton, O.

57,179 Garment protector. Patented February 22, 1921. Term 14 years. G. K. Guinzburg, assignor to I. B. Kleinert Rubber Co.—both of New York.

THE DOMINION OF CANADA

4,978 Tire. Patented January 25, 1921. Regal Tire & Rubber Co., Limited, Sherbrooke, Que.

4,979 Tire tread. Patented January 25, 1921. Van der Linde Rubber Co., Limited, Toronto, Ont.

4,983 Tire. Patented February 1, 1921. Dunlop Tire & Rubber Goods Co., Limited, Toronto, Ont.

4,984 Tire. Patented February 1, 1921. Dunlop Tire & Rubber Goods Co., Limited, Toronto, Ont.

GERMANY
DESIGN PATENTS ISSUED, WITH DATES OF ISSUE

760,666 (November 4, 1920.) Tube. Albert Krautzberger, Holzhausen near Leipzig.

760,753 (November 16, 1920.) Rubber sole. Schmidt's Gummiwarenfabrik. Arthur Schmidt, Stade.

760,862 (September 29, 1920.) Rubber tooth cleaner and polisher. Carl Paul Schultz, Holzstrasse 5, Munich.

761,004 (November 24, 1920.) Tire of elastic material. Schmidt's Gummiwarenfabrik. Arthur Schmidt, Stade.

761,071 (November 22, 1920.) Rim for solid tire. Fassoneisen Walzwerk. L. Mannstaedt & Cie. Akt. Ges. Troisdorf near Cologne on Rhine.

761,264 (November 16, 1920.) Elastic tire. Schmidt's Gummiwarenfabrik. Arthur Schmidt, Stade, Hann.

761,351 (July 1, 1915.) Tire substitute for trucks. Mitteldeutsche Gummiwarenfabrik. Louis Peter, A. G. Frankfort-on-the-Main.

761,483 (November 9, 1920.) Rubber tread for bicycle tires. Deutsch Kabelwerke A. G. Abt. Gummiwaren Fabrik, Berlin.

761,662 (October 18, 1920.) Solid rubber suspenders. Schaffner & Co., Hersfeld.

761,766 (November 18, 1920.) Elastic tire. Gerhard Klemm, Fürstenwalde, Spree.

761,817 (October 5, 1920.) Holder for artificial teeth with rubber that remains soft. Otto Thomas Mayer, Ochsenhausen, O.-A. Biberach.

761,825 (October 23, 1920.) Fastening button for the rubber sucker of plates of artificial teeth. Hans Weltzler, Geleitstrasse 14, Offenbach a. Main.

761,826 (October 27, 1920.) Rubber cattle irrigator tube in two parts. Curt Schellbach, Seiferitz-Meerane, i. s.

761,839 (November 18, 1920.) Rust protecting insert for pneumatic fellies. Richard Freudenberg, Oberfriedersdorf.

761,841 (November 19, 1920.) Tip mounting for crutches, etc., with ball and socket joint rubber case. Georg Herrle, Grafenaschau b. Murnau.

762,064 (December 2, 1920.) Rim for solid tires. Faconeisen-Walzwerk L. Mannstaedt & Cie., A. G. Troisdorf.

762,734 (November 26, 1920.) Syringe. Constantin Walter, Friedrich Karl strasse 24c, Stettin.

762,736 (November 29, 1920.) Heel pad of sponge rubber. Supinator-Compagnie, Frankfurt a. Main.

762,868 (November 19, 1920.) Rubber heel holder. Josef Kersting, Benderstrasse 102, Düsseldorf-Gerresheim.

762,936 (September 24, 1920.) Rubber sucker with beaker-shaped receiver. Karl Wägerle, Dammstrasse, Heilbronn.

762,950 (November 9, 1920.) Non-skid pneumatic tread. Paul Repenning, Prinzenstrasse 9, Rendsburg.

763,019 (October 27, 1920.) Viber rubber plate. Friedrich Thielman, Waldstrasse 54, Frankfurt a. Main-Niederrad.

763,323 (December 16, 1920.) Artificial leg with rubber foot. Paul Kellberg Ferdinandplatz 1, Dresden.

763,414 (November 26, 1920.) Anti-slipping rivet for rubber soles and heels. August Allgair, Blumenstrasse 5, Hanover.

763,429 (December 16, 1920.) Pneumatic tire protector. A. Pick, Nordstrasse 21, Dusseldorf.

763,431 (December 17, 1920.) Running land for cycles. Brunonia Gummi-Werke Richard Hagemann, Braunschweig.

763,531 (November 10, 1920.) Repair strip material for automobile, motorcycle and bicycle tires. L. Runge, Edewechterdamm near Edewecht i. O.

763,717 (March 12, 1920.) Fellce for rubber tires. August Wittig, Klosterstrasse 45, Dusseldorf.

764,467 (December 13, 1920.) Pessary. Eugen Knödler, Karlstrasse 22, Stuttgart-Cannstatt.

764,611 (December 24, 1920.) Urinal. Asmus Zeichner, Vogelweide 9, Hamburg.

765,511 (February 22, 1918.) Anti-skid device. Irvine Brook, Yorkshire, England; represented by A. Elliot, Berlin, S. W. 48.

765,516 (November 4, 1919.) Tire. Richard Ludwig, Auma i. Thu.

765,970 (January 6, 1921.) Rubber suspender. Rudolf Thume, Planitzstrasse 128, Chemnitz.

766,061 (January 12, 1921.) Catheter with corkscrew-like end for insertion. Dr. Albrecht Meyerberg. Potsdamerstrasse 72 b.; Berlin.

766,361 (July 29, 1918.) Rubber stopper for milk bottle. Frederick Richard Graham-Yooll, Dulham Towers; represented by R. Geissler, Berlin, S. W. 11.

766,451 (May 12, 1920.) Rubber sole. William Gollombeck, Lazarusstrasse 19, Spandau.

766,750 (January 17, 1921.) Intra-uterine pessary with various ring inserts. Ernst Jakob, Obertürkheim.

766,772 (January 20, 1921.) Artificial leg with rubber foot. Paul Kellberg, Ferdinandplatz 1, Dresden.

766,802 (November 15, 1920.) Dental and surgical ball syringe. Eugen Lampe, Ifflandstrasse 53, Hamburg.

766,832 (January 19, 1921.) Demountable injection syringe. Wilhelm Heinrich Gerard van der Ven, Rees-on-Rhine.

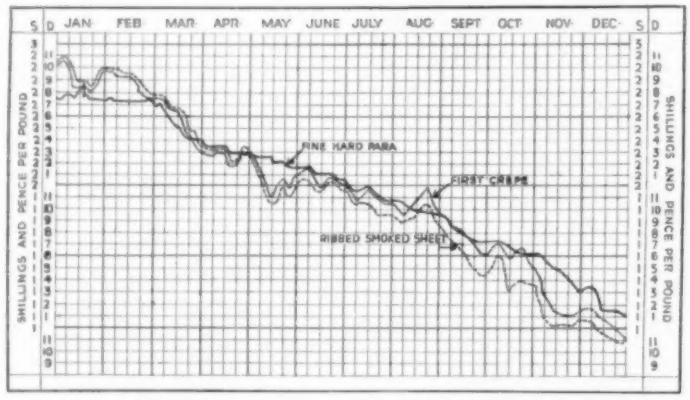
766,872 (March 23, 1920.) Pneumatic tire protector. Georg Krisch, Wildbad, Württ.

The London View of the 1920 Crude Rubber Market

SUPPLY EXCEEDS DEMAND

The distinguishing feature of 1920 was the great actual and enormous potential supply of crude rubber and the lessened demand for it, especially since March. The rubber trade has experienced the worst crisis in its history, but the prospects are that the situation will improve during the present year. The large amount of rubber which American manufacturers bought at the end of 1919 and the beginning of 1920 was made into manufactured goods in anticipation of a generally overestimated European demand. As a result, manufacturers were left with large quantities of manufactured goods, yet still had to buy considerable quantities of crude rubber at high prices. But for this, prices would not have reached the unjustified high level of last Winter.

During the past two years supply has exceeded demand. This has been chiefly plantation rubber. The 1920 supply of wild rubber, except for 28,000 tons from Brazil and Amazonas and about 2,500 tons from the Congo, has been negligible and toward the end of the year almost unsalable, except fine hard Pará. The reclaiming of old rubber has decreased considerably because of the low prices of crude. Forward sales by estates over 1921 are much less than usual, and there is no doubt that after contracts at high prices have been liquidated the position as regards new buying powers will have improved. In Europe, though the use of automobiles is small, there is a considerable increase in bicycles, and Germany has bought a little rubber.



London Spot Fluctuations of Fine Hard Para First Crêpe and Ribbed Smoked Sheet During 1920

THE MARKET

The high prices (highest 2*s.* 10½*d.* in January for both standard crêpe and ribbed smoked sheets) with which the year began, partly owing to a market operator's shortage, continued until March, when the price fell to 2*s.* 2½*d.* and continued with small fluctuations until July, when 1*s.* 9*d.* was reached. The most serious fall came in the Autumn. The price of 1*s.* 9*d.* at the beginning of September dropped two months later to 1*s.* 1*d.*, and the market closed at the end of the year with standard crêpe at 11¼*d.* and ribbed smoked sheets at 10¼*d.* The agreement made in October by members of the Rubber Growers' Association to curtail plantation output by 25 per cent was without effect, and it was not until early in 1921, when it was reported that the Malay Government would probably advocate legislation restricting output and export by 50 per cent, that the market improved, the advance on January 15, 1921, being about 4½*d.* above the lowest prices of last year.

The price of fine hard Pará has dropped almost continually throughout the year, starting in January at 2*s.* 7½*d.* and closing in December at 1*s.* 0½*d.*, an unprecedented low figure. Trading has been very small. The demand for negroheads has almost ceased and caucho ball sells for 11*d.* per pound.

The prices in the last three years on December 31 have been as follows:

	Fine Hard Pará	Negrohead Scrappy	Negrohead Island	Caucho Ball
1920	1*s.* 0¼*d.*	10½*d.*	7*d.*	11*d.*
1919	2*s.* 7¼*d.*	1*s.* 7*d.*	1*s.*	1*s.* 8*d.*
1918	2*s.* 7*d.*	1*s.* 7*d.*	1*s.*	1*s.* 8*d.*

Jelutong has been in less demand, its value being £40 per ton c. i. f. Compressed jelutong is worth 6*d.* per pound. Balata has continued high with small fluctuations. Sheet on the spot has been about 4*s.* 6*d.* most of the year and is now quoted at 4*s.* 2*d.* for shipment c. i. f. Block has been very firm and high although business has been small and the demand has fallen off. Its spot value is 3*s.* 9*d.*, forward shipment c. i. f. 3*s.* 8*d.* Owing to the scarcity, gutta percha has realized high prices.

PLANTATION RUBBER

PREPARATION AND PACKING

There has been an unusual number of claims for quality, particularly from New York on ribbed smoked sheets. Part of the inferior condition of the rubber has been caused on the voyage by improper stowage or damage by the elements, but it is believed that considerable rubber has not been so carefully prepared nor so well dried as formerly. Buyers have suffered losses in consequence, although allowances have been heavy and disappointing to shippers. In this connection and otherwise the Rubber Growers' Association and the Rubber Trade Association have been of great service during the year.

Close pressed packing in bales and cases has been discontinued owing to the objections of manufacturers. Quite a large percentage of rubber has arrived in cases not sufficiently strong, which has entailed additional expense to importers.

ACREAGE OF PLANTATION RUBBER

The only increase of moment in planted areas has been in Malaya and Malacca, where the advance has been some 300,000 acres. Planting has increased slightly in India, Burma and the Mergui and is being extended somewhat, but the East African plantations of Ceará are not progressing and scarcely any shipments have been received. The plantations, chiefly of Castilloa, in Mexico, West Indies, Central and South America, have almost ceased producing. The estimated plantation acreages for the past three years follow:

	1918	1919	1920
Ceylon .....*acres*	300,000	300,000	300,000
Malaya, Malacca	800,000	800,000	1,100,000
Borneo	50,000	50,000	50,000
Dutch East Indies.....	700,000	700,000	700,000
India and Burma.....	55,000	55,000	55,000
Former German Colonies:			
Samoa, East and West Africa	8,000	8,000	8,000
	1,913,000	1,913,000	2,213,000
W. H. Rickinson & Son estimates:			
Acres in bearing.....	2,021,750	2,181,050	2,293,750
Area under plantation rubber..	2,759,950	2,910,750	3,020,750

SOUTH AND CENTRAL AMERICAN RUBBER

The year 1920 was very disappointing to shippers of South American rubber. The supply from Amazonas showed little change, but that from Brazil decreased. Doubtless New York stocks of fine hard Pará held over from the previous crop totaled 3,000 tons, but with normal trade this would have been insignificant. In consequence shipments from Brazil, Bolivia and Peru fell off some 6,000 tons, whereas Peruvian and caucho shipments were only some 300 tons less than the previous year. Total shipments for the past three years have been:

	1918	1919	1920
Brazil, Bolivia and Peru....*tons*	34,350	34,200	28,160
Including Peruvian and Caucho	8,400	6,800	6,471

Medium descriptions generally have again been very much reduced, and except for supplies awaiting shipment at the ports of producing countries, have practically ceased. Bolivia has sent fine hard Pará, and caucho ball has come from the Amazon tributaries, but almost nothing from Mollendo and very small amounts from Matto Grosso. The quantities of Ceará and Maniçoba were practically negligible.

Central American descriptions have almost ceased to appear in the market. Guayule imports into New York were 1,050 tons.

The following table shows the annual receipts and shipments at Pará during the past three years:

	1918	1919	1920
Receipts of Pará.....*tons*	23,000	27,385	21,690
Receipts of caucho.....	8,600	6,800	6,471
Shipments to Europe.....	6,035	11,308	10,761
Shipments to the United States.....	19,350	27,275	18,262

AFRICAN RUBBER

The quantity of African rubber on the market has decreased considerably. West Coast African imports from all districts have fallen off largely. Congo supplies are less, Antwerp imports being about 2,400 tons. There have been a few small shipments from Madagascar and Mozambique, also some old parcels of Manihot from East Africa which were difficult to sell.

EAST INDIAN RUBBER

The Asiatic districts of Rangoon and Assam sent practically nothing, and small shipments from Penang have been only partly sold. Java and Sumatra have sent practically no cultivated red Ficus rubber, and no wild rubber has come from Borneo. Balata imports have fallen off, especially block. Gutta percha has been scarce.

BRITISH STOCKS

British stocks on December 31 were 56,499 tons of which 620 tons were Pará or caucho and 55,879 tons were plantation rubber. British imports of all sorts for the year were 103,095 tons, and deliveries 71,046 tons. Of these 7,285 tons imported and 7,435 tons delivered were Pará or caucho. During the whole of the past year British manufacturers have practically been living on the 1919 stocks.

DUTCH STOCKS

Complete Dutch statistics for 1920 are not yet available. Plantation imports up to October 31 were 8,899 tons, and exports, 4,628 tons. Stocks of all descriptions totaled 4,918 tons. Imports were rather larger during the last two months of the year and stocks December 31 were estimated at between 7,000 and 8,000 tons.

AMERICAN IMPORTS

Imports of all descriptions into the United States were estimated by The Rubber Association of America to total 234,663 tons in 1920 against 231,510 tons in 1919. Of the 1920 imports 196,972 tons were plantations; 18,391 tons Parás; 3,881 tons Africans; 713 tons Centrals; 1,037 tons guayule; 86 tons Maniçoba and Matto Grosso; 481 tons balata; 8,113 tons miscellaneous gum. The official statistics of the United States show total imports exclusive of rubber scrap, amounting to 590,464,159 pounds in 1920 against 565,931,299 pounds in 1919.

WORLD'S RUBBER PRODUCTION

Numerous attempts have been made to estimate the world's production, distribution and consumption of crude rubber during the past year with widely divergent results, owing to the absence of entirely reliable or authoritative statistics and differences in methods of estimation.

The world's production of crude rubber of all kinds for the year 1920 is variously estimated by authorities at 305,000 to 368,000 tons. Stocks in the East, England, America and afloat were believed to have increased about 80,000 tons on January 1, 1921, but there was much less afloat than at the same time last year, a reliable estimate being 30,799 tons against 37,340 tons the year previous.

W. H. Rickinson & Son estimate production as follows:

	1918	1919	1920
Plantation .....*tons*	200,950	*340,225	304,816
Brazil	30,700	34,285	30,790
Rest	9,929	7,350	8,125
Totals .....*tons*	241,579	381,860	343,731

*Including 55,000 tons from 1918.

Symington & Sinclair estimate production thus:

	1919	1920	1921 Estimated
Malaya .....*tons*	180,000	190,000	130,000
Ceylon and India.....	35,000	40,000	25,000
Dutch East Indies.....	75,000	85,000	55,000
Other Eastern Countries.....	10,000	15,000	10,000
Total Plantations	300,000	330,000	220,000
Brazil	32,000	31,000	20,000
Wild	7,000	7,000	5,000
Totals .....*tons*	339,000	368,000	245,000

S. Figgis & Co. estimate total production at 305,000 tons, 255,500 tons plantation, 28,160 tons Brazilian and the balance wild rubber.

DISTRIBUTION AND CONSUMPTION

W. H. Rickinson & Son estimate distribution as follows:

	1918	1919	1920
America .....*tons*	142,772	236,977	235,000
Great Britain	30,104	42,520	56,972
Russia	2,000	1,500	300
Germany and Austria.....	1,000	4,000	9,300
France	18,000	22,000	14,500
Italy, etc.	9,800	14,000	7,000
Scandinavia	5,000	7,000	7,700
Japan and Australia	7,400	12,000	6,000
Canada	8,300	9,500	11,000
Belgium	....	5,000	3,500
Totals .....*tons*	224,376	354,497	351,272

Symington & Sinclair estimate consumption thus:

	1919	1920	1921 Estimated
United States .....*tons*	230,000	220,000	225,000
United Kingdom	33,000	25,000	24,000
France	22,000	14,000	12,000
Italy	14,000	6,000	3,000
Canada	9,500	11,000	12,000
Australia and Japan.....	10,000	9,000	9,000
Germany, Austria, Russia.....	5,500	9,000	9,000
Scandinavia	3,500	6,000	6,000
Belgium	2,000	2,000	2,000
Other Countries	3,500	1,000	1,000
Totals .....*tons*	333,000	303,000	303,000

With a few exceptions the crude rubber imports of consuming countries may be taken as their consumption. British consumption is readily ascertained by deducting exports and domestic deliveries from the sum of stocks and imports. Belgium and Holland, in addition to their transit trade, have small markets in Antwerp, Amsterdam and Rotterdam, where at present moderate stocks are carried. Bordeaux, France, and Hamburg, Germany, both important pre-war markets, have not yet recovered. The real difficulty in estimating consumption is the figure for the United States, the largest consumer and hence the most important. While American imports for 1920 were 235,000 tons, consumption probably did not exceed 220,000 tons. On this assumption the world's 1920 consumption was about 303,000 tons, and taking 368,000 tons as the production for the year, there was an unconsumed surplus of production of 65,000 tons, exclusive of any carry-over from 1919.

Symington & Sinclair estimate the total visible supply of crude rubber at the end of 1920 at 207,000 tons. This is exclusive of manufacturers' stocks which are known to be generally heavy. They point out, however, the distinction that should be made between a real surplus and the necessary visible supply to safeguard the industry, owing to the long voyage from producing to consuming countries. On the basis of a world's consumption of 300,000 tons per annum, a four months' supply means 100,000 tons. To this must be added some 35,000 tons for necessary stocks in the New York and London markets and allowances for normal shipments awaiting sailings at various producing

markets. This total of 135,000 tons deducted from the total visible supply of 207,000 tons leaves a real estimated surplus of 72,000 tons, which it is believed will be reduced to about 14,000 tons by the end of this year.

Much of the information contained in the above review was supplied by S. Figgis & Co., London, England.

THE ANTWERP 1920 CRUDE RUBBER MARKET

AS SOON AS POSSIBLE after the Armistice was signed Antwerp importers of rubber became active, and first Congo and later Malayan rubber began to arrive in increasing quantities, finding during 1919 and the first part of 1920 ready sale at very favorable prices, due to the advance in price and the increase in value of the pound sterling. However, this condition was soon followed by a period of stagnation when rubber which at the beginning of 1920 obtained 2*s.* 10*d.* a pound dropped to 10*d.* a pound.

Prices at the close of December, 1920, showed a decrease of 15 to 25 per cent in Congo grades as compared with prices at the end of December, 1920. The decrease for plantations was about 37 per cent and for fine Pará about 58 per cent. Thus, red Kassai I, which, at the end of 1919, sold at 5.75 francs, dropped to 4.75 at the close of 1920; red Kassai, grade Loanda II, brought 3.75 as against 4.85 the year before. Black Kassai was quoted at 5 francs as against 5.75. White rubbers, Equator, Ikelemba, Lopori, etc., ordinary upper Congo, and Aruwimi, Uelé, all showed declines from 5.75 to 5 francs. Red Congo Wamba was only 3.60 as compared with 4.70. Fine Pará came down from 2*s.* 7*d.* to 1*s.* 1*d.* and plantation crêpe I, from 9.50 francs to 6 francs.

The futures market suffered from the general conditions. At the beginning of January, 11.35-11.25 francs were quoted, then the rise in exchange gradually brought the figure higher until about the middle of May, the market for futures was 14.75-14.55 francs. After this, prices gradually and steadily declined until at the end of the year the decrease was about 50 per cent. The market was very restricted and transactions did not amount to more than 3,700,000 kilos.

Imports for the year 1920 amounted to 2,304,162 kilos, Belgian Congo and others, against 2,233,889 kilos in 1919 and 3,006,470 kilos in 1913. The amounts of plantation grades were 621,088 in 1920, 49,883 in 1919 and 2,033,039 in 1913, giving for all kinds totals of 2,925,250 kilos in 1920, compared with 2,283,772 kilos in 1919 and 5,039,509 kilos in 1913. As will be noted, there is a slight increase in the amounts of 1920 over those of 1919, but both are still a good deal behind the figures for 1913.

The decrease in Congo rubbers is ascribed to lower output due to the fact that during the war the planters paid more attention to other products and also to the fact that preference is being given to plantation rubbers. The quality of Congo rubbers continues to be regular and satisfactory. Lots of Congo plantation rubber, generally well-prepared sheet or biscuit, found ready buyers at prices equivalent to those obtained by Eastern plantations.

CEYLON RUBBER IMPORTS AND EXPORTS, 1919-1920

IMPORTS

		January 1 to December 31	
		1919	1920
Crude rubber:			
From Straits Settlements	*pounds*	2,755,106	2,722,724
India		1,885,634	1,697,463
Burma and other countries		3,436	42,768
Totals		4,644,176	4,462,955

EXPORTS

Crude rubber:			
To United Kingdom	*pounds*	32,973,661	44,717,774
Belgium		65,351	259,150
France		383,400	777,113
Germany		11,050	1,062,362
Holland		13,476	165,794
Spain		26	.....
Victoria		98,755	391,991
New South Wales		171,812	499,417
United States		65,473,466	38,233,874
Canada and Newfoundland		931,034	580,304
India		2,899	2,176
Straits Settlements		474	44,800
Japan		267,427	326,345
Italy		.....	230,720
Norway		.....	4,480
Western Australia		.....	56
Totals		100,392,831	87,296,356

CEYLON RUBBER EXPORTS DURING THE PAST TEN YEARS

Total export from 1st Jan. to 31st Dec., 1920	*pounds*	87,296,356
Total export from 1st Jan. to 31st Dec., 1919		100,392,831
Total export from 1st Jan. to 31st Dec., 1918		47,219,128
Total export from 1st Jan. to 31st Dec., 1917		71,351,629
Total export from 1st. Jan. to 31st Dec., 1916		54,698,729
Total export from 1st Jan. to 31st Dec., 1915		46,566,187
Total export from 1st Jan. to 31st Dec., 1914		35,318,269
Total export from 1st Jan. to 31st Dec., 1913		25,433,551
Total export from 1st Jan. to 31st Dec., 1912		15,001,075
Total export from 1st Jan. to 31st Dec., 1911		7,154,658

Compiled by the Ceylon Chamber of Commerce.

RUBBER EXPORTS FROM PENANG FOR THE YEARS 1919 AND 1920

		January 1 to December 31	
		1919	1920
To Great Britain:			
Pará rubber	*piculs*[1]	$232,393	$259,971
India rubber		47	2,911
Totals, Great Britain		$232,440	$262,882
To Europe:			
Pará rubber		....	$3,796
Totals, Europe		....	$3,796
To United States:			
Pará rubber		$147,554	$145,177
India rubber		433	694
Gutta rambong		....	166
Totals, United States	*piculs*	$147,987	$146,037
Grand totals	*piculs*	$380,427	$412,715

[1]One picul equals 133⅓ pounds.

PLANTATION RUBBER EXPORTS FROM JAVA*

		November		Eleven Months Ended November 30	
		1919	1920	1919	1920
To Netherlands	*kilos*	620,000	486,000	2,646,000	4,593,000
Great Britain		880,000	720,000	7,033,000	8,063,000
Germany		.....	20,000	.....	109,000
France		.....	20,000	215,000	43,000
Belgium		.....	.....	.....	117,000
Italy		.....	17,000	.....	42,000
Other European destinations		.....	.....	.....	.....
United States		909,000	751,000	16,541,000	11,536,000
Singapore		414,000	645,000	5,008,000	4,189,000
Japan		.....	10,000	183,000	194,000
Australia		.....	44,000	245,000	234,000
Other countries		.....	.....	169,000	.....
Totals	*kilos*	2,823,000	2,713,000	32,040,000	29,120,000
Ports of origin:					
Tandjong Priok	*kilos*	1,359,000	1,604,000	16,267,000	13,730,000
Samarang		44,000	44,000	504,000	475,000
Soerabaya		1,414,000	825,000	14,161,000	13,827,000

*September figures, 1919 and 1920, revised.

ANTWERP RUBBER ARRIVALS

FEBRUARY 11. By the S. S. "Anversville," from the Congo.

Société Anonyme Bungé (Cie du Congo belge)	*kilos*	115
Société Anonyme Bungé		359
Société Anonyme Bungé (Comptoir Colonial Belgika)		2,720
Société Coloniale Anversoise (Compagnie du Kessai)		11,630
Société Coloniale Anversoise (Lomami)		1,125
Société Coloniale Anversoise (S. A. B.)		1,880
Société Coloniale Anversoise (C. F. H. C.)		23,490
Various		1,766
Total	*kilos*	43,085

Compiled by Grisor & Co., Antwerp.

UNITED STATES CRUDE RUBBER IMPORTS FOR 1921 (BY MONTHS)

1921		Plantations	Pará	Africans	Centrals	Guayule	Manicoba and Matto Grosso	Balata	Miscellaneous Gum	Waste	Totals 1921	Totals 1920
January	*tons*	12,819	1,312	43	3	.....	.....	41	173	1,071	15,462	22,401
February		7,913	432	269	2	223	.....	25	216	37	9,117	33,984
Totals, 2 months, 1921		20,732	1,744	312	5	223	.....	66	389	1,108	24,579	.....
Totals, 2 months, 1920		47,480	5,076	1,379	376	34	.....	132	1,248	660	.....	56,385

Compiled by The Rubber Association of America, Inc.

Review of the Crude Rubber Market

NEW YORK

THE GENERALLY QUIET CONDITIONS that have ruled in the market during the past month are said to be largely due to the belief of factory buyers that ample supplies are available at any time at reasonable prices. This theory, however, would not hold good in the event of an unexpected buying movement that may occur at any time.

During the second week of the month, plantation July-December positions which had been firm at 23 to 24 cents were sold freely and the market weakened, spot being offered at 16 to 17 cents by dealers for direct factory business. Then other futures became easier, April-June selling at 18½, and July-September at 20 cents.

Considerable selling developed about the middle of the month between dealers and factories, in fact the best trading known for some time but later, weakness developed and the market tendency was lower, spot plantations selling as low as 16 cents. Stimulated by reports of renewed activity in automobile manufacturing, the market firmed up, spot and April-May being quoted 17½ to 18 cents, April-June, 18 to 18½ cents, and July-September 19 to 20 cents. In all positions these prices could have been shaded on all good factory business.

The actual demand noticeable the latter part of the month was from small factories and western concerns who had liquidated their high priced stocks, and from those who are manufacturing tires on orders. These indications point to a gradual increase in demand for the crude material from now on, with prices around present levels due to existing stocks. Futures should be more active considering the gradual improvement in market and exchange conditions.

Imports during February were 8,839 tons of all grades, compared with 32,994 tons a year ago. February plantation arrivals were 7,913 tons, compared with 29,681 tons last year. Total imports for the first two months of 1921 were 23,016 tons compared with 54,346 tons for the same period in 1920.

Spot and future quotations on standard plantation and Brazilian sorts were as follows.

PLANTATIONS. March 5, spot first latex crêpe, 19½ cents; April-June, 20 cents; July-September, 22½ cents; July-December, 24½ cents.

March 26, spot first latex crêpe, 18½ to 19 cents; April-June, 19½ to 20 cents; July-September, 21 cents; July-December, 22 to 23 cents.

March 5, spot ribbed smoked sheets, 17½ cents; April-June, 18¼ cents; July-September, 21 cents; July-December, 23 cents.

March 26, spot ribbed smoked sheets, 17 cents; April-June, 17½ to 18 cents; July-September, 19 to 20 cents; July-December, 20½ to 21 cents.

March 5, No. 1, amber crêpe, 16 cents.

March 26, No. 1, amber crêpe, 15½ cents.

March 5, No. 1, rolled brown crêpe, 11 to 12 cents.

March 26, No. 1, rolled brown crêpe, 12 cents.

SOUTH AMERICAN PARÁS AND CAUCHO. March 5, upriver fine, 17½ cents; islands fine, 17½ cents; upriver coarse, 11½ cents; islands coarse, 11 cents; Cameta, 11 cents; caucho ball, 12½ to 14½ cents.

March 26, upriver fine, 17¼ to 17½ cents; islands fine, 17 to 18 cents; upriver coarse, 11 to 11½ cents; islands coarse, 12 cents; Cameta, 10½ to 11 cents; caucho ball, 12 to 14 cents.

NEW YORK QUOTATIONS

Following are the New York spot quotations, for one year ago, one month ago, and March 26, the current date:

	April 1, 1920	March 1, 1921	March 26, 1921
PLANTATION HEVEA			
First latex crêpe	$0.46½@.47	$0.20 @.20½	$0.18½@.19
Off latex crêpe	@	@ .17	@.18
Amber crêpe No. 1	.46 @	.16¼@.16½	.15½@.16
Amber crêpe No. 2	.45½@	.15¼@.15½	.14½@.15
Amber crêpe No. 3	.44½@	.14¼@.14½	.13½@.14
Amber crêpe No. 4	.42½@	.13½@.14	.12½@.13
Brown crêpe, thick and thin	.43 @	.13 @.13½	.13½@.14
Brown crêpe, specky	.41 @	.11 @.12	.11 @.12
Brown crêpe, rolled	.40 @	.12½@.13	.12 @
Smoked sheet, ribbed	.46 @	.18½@.19	.17 @
Smoked sheet, plain	.45 @	.17½@	.15 @.16
Unsmoked sheet	@	.16½@	.15 @
Colombo scrap No. 1	.33 @	.12 @	.11 @
Colombo scrap No. 2	.31 @	.10 @	.09 @
EAST INDIAN			
Assam crêpe	@	@	@
Assam onions	@	@	@
Penang block scrap	@	@	@
PONTIANAK			
Banjermassin	.13 @	.07 @.08	.07 @
Palembang	@	@	.09 @
Pressed block	.25 @	.11¾@.12½	.11¾@
Sarawak	@	.06½@	.06 @
SOUTH AMERICAN			
PARAS			
Upriver, fine	.42 @.42½	.17½@.18	.17 @.17½
Upriver, medium	.39½@.40	.15 @	.14 @
Upriver, coarse	.31 @	.12½@.13¼	.11 @.11½
Upriver, weak, fine	.35 @	.12 @.13	.11 @.12
Islands, fine	.41 @	.17½@.18	.17 @
Islands, medium	.39½@.40	.15 @	.13 @
Islands, coarse	.21 @.21½	.11 @	.12 @
Cametá	.22 @	.11½@.12	.10½@
Acre Bolivian, fine	@	.18 @.18½	.18 @
Madeira, fine	@	.18½@.20	.19½@.20
Peruvian, fine	.40¾@	.16 @.17	.16 @
Tapajos, âne	@	.16½@.17	.16 @.16½
CAUCHO			
Upper caucho ball	.32 @	.14½@.15	.14 @
Lower caucho ball	.30 @	.12½@.13	.10½@
MANICOBAS			
Ceará negro heads	.36 @	*.13 @	.10 @
Ceará scrap	.30 @	*.10 @	.05 @
Manicoba, 30% guarantee	.32 @	*.12½@	.09½@.10
Mangabeira thin sheet	.30 @	*.15 @	.12 @

CENTRALS	April 1, 1920	March 1, 1921	March 26, 1921
Corinto scrap	.28 @.29	.12 @	.11 @.12
Central scrap	.26 @.27	.12 @	.11 @.12
Central scrap and strip	.25 @.26	.10 @.11	.08 @.10
Central wet sheet	.20 @	.06 @.07	.05 @.07
Esmeralda sausage	.27 @.28	.12 @	.11 @.12
Guayule, 20% guarantee	.27 @	@	@
Guayule, washed and dried	.38 @	*.26 @	*.26 @
AFRICANS			
Benguela, extra No. 1, 28%	.26½@	@	@
Benguela, No. 2, 32½%	.23 @	.07 @	@
Conakry niggers	.35 @	@	@
Congo prime, black upper	@	*.15 @	@
Congo, prime, red upper	@	*.12 @	@
Kassai, black	.38 @	*.15 @	@
red	@	@	@
Massai sheets and strings	@	@	@
Niger flake, prime	.18½@	*.17 @	@
Rio Nunez ball	@	@	@
Rio Nunez sheets, strings	.36 @	@	@
GUTTA PERCHA			
Gutta Siak	.29 @.30	.17 @	.15½@
Red Macassar	2.60 @	2.10 @3.00	2.25 @
BALATA			
Block, Ciudad Bolivar	.58 @.60	.60 @.61	.56 @
Colombia	.49 @.50	.45 @.46	.47 @.48
Panama	.40 @.46	.45 @.46	.46 @.47
Surinam sheet	.78 @	.69 @.70	.68 @.69
amber	.82 @	.84 @	.80 @.82

*Nominal.

RECLAIMED RUBBER

During the past month a steadily increasing demand for reclaimed rubber destined for the insulated wire trade, and automobile topping particularly, has been noted. As yet this demand has not been sufficient to warrant general resumption of production on the part of reclaimers. Apparently the tide has turned and continued increase in business is looked for as the spring advances. Quotations are nominal and unchanged.

NEW YORK QUOTATIONS

March 26, 1921

Prices subject to change without notice

STANDARD RECLAIMS		
Floating	*$0.15	@$0.18
Friction	* .15	@ .18
Mechanical	* .09	@ .11
Shoe	* .12½	@ .13½
Tires, auto	* .12	@ .13½
truck	* .09	@ .11
White	* .15	@ .18

*Nominal.

COMPARATIVE LOW AND HIGH NEW YORK SPOT RUBBER PRICES

	March 1921*	March 1920	March 1919
PLANTATIONS:			
First latex crêpe	$0.18 @ $0.19½	$0.46 @ $0.48¼	$0.51 @ $0.56
Smoked sheet ribbed	.16¼ @ .18	.46 @ .48	.50 @ .54½
PARAS:			
Upriver, fine	.17 @ .18	.41½ @ .43	.55½ @ .58½
Upriver, coarse	.11¼ @ .12	.31¼ @ .31½	.34 @ .35
Islands, fine	.17 @ .18	.41½ @ .44½	.47½ @ .49½
Islands, coarse	.11 @ .12	.21½ @ .22	.22 @ .22½
Cametá	.11 @	.21½ @ .22	.21 @ .23

*Figured to March 26, 1921.

SINGAPORE RUBBER MARKET

GUTHRIE & CO., LIMITED, Singapore, report under date of February 3, 1921:

The weekly rubber auction held yesterday opened with a firm tone, but owing to the early withdrawal of certain buyers demand fell away and prices declined. At the commencement of the sale standard sheet sold freely at 35 cents, but thereafter only 34 cents was obtainable. A few lots of standard crêpe sold at 35½ to 36½ cents. Off quality crêpe was difficult of sale, there being a wide margin between the prices obtained for off lots and that ruling for standard. Off quality sheet was in good demand, at 2 to 3 cents down. Brown crêpes were a strong market and advanced 2 to 3 cents, while dark and bark crêpes were readily salable at 1 to 2 cents up on the week. Six hundred and fifty-six tons were catalogued for sale, and 383 tons sold. The following is the course of values:

	In Singapore per pound[1]	Sterling Equivalent per pound in London
Sheet, fine ribbed smoked	34 @ 35c	—/11⅞ @ 1/ 0⅛
Sheet, good ribbed smoked	20 @ 32	—/ 7⅞ @ —/11¼
Crêpe, fine pale	35½ @ 36½	1/ 0¾ @ 1/ 1⅛
Crêpe, good pale	22 @ 34	—/ 9 @ 1/ 0¾
Crêpe, fine brown	20½ @ 26½	—/ 8½ @ —/10¼
Crêpe, good brown	14 @ 20	—/ 6⅛ @ —/ 8⅛
Crêpe, dark	13 @ 18	—/ 6⅛ @ —/ 7⅝
Crêpe, bark	13 @ 15½	—/ 6⅛ @ —/ 7⅛

[1]Quoted in Straits Settlements currency, $1 equals $0.567 United States currency.

AMSTERDAM RUBBER MARKET

JOOSTEN & JANSSEN, Amsterdam, report, under date of March 4, 1921:

The tone of the market this week was depressed and the movement on the London market caused a not unimportant decline here also.

Regular business resulted on the terminal market as offerings, which mostly were not pressing, found fairly ready buyers.

Also in spot crêpe and sheets some sales took place at comparatively good prices.

The close is quiet with pretty good demand and little offering at the reduced prices.

We quote:

Hevea crêpe, Fl. 61. Sheets, Fl. 54 on the spot.
Hevea crêpe, Fl. 64. Sheets, Fl. 58 April-June.
Hevea crêpe, Fl. 69. Sheets, Fl. 64 July-September.
Hevea crêpe, Fl. 74. Sheets, Fl. 69 October-December.

HAMBURG RUBBER MARKET

EFFEKTIV-ROHGUMMIMAKLER-VEREIN, Hamburg, report, February 12, 1921:

The week opened very quietly. Eastern market prices were firm and higher, but without immediately affecting the consumer's market. Toward the middle of the week business became quite active owing to demand from German consumers, as the drop in foreign exchanges made the execution of orders possible. Then prices suddenly advanced and the higher market prevented many transactions, so that the week ended considerably quieter, although the exchanges were in our favor. London also closed very quietly and ¼*d.* lower.

Business was done in almost all qualities. The prices moved between:

	Marks
First latex	28 @ 32
Ribbed smoked sheets	24 @ 28
Smoked sheets, lower grade	21 @ 24
Brown crêpe, clean	21 @ 24
Brown crêpe, somewhat barky	17 @ 20
Dark crêpe	15 @ 18
Hard fine Pará	27 @ 32
Caucho ball	20 @ 23
Congos	18 @ 23
Block balata	60 @ 90
No. 1 balata sheet	110 @130
Jelutong	13 @ 17
Bandjer soh	50 @ 60

ANTWERP RUBBER MARKET

GRISAR & CO., Antwerp, report under date of March 4, 1921:

The London market remained very quiet in consequence of the absence of orders. Rates are slightly lower. We close at the following prices: First latex crêpe, March, 1*s.* 0¼*d.*; April–June, 1*s.* 1*d.*; July–September, 1*s.* 2*d.*; July–December, 1*s.* 2½*d.*; October–December, 1*s.* 3¼*d.* (buyers). Fine Pará, 11½*d.*

Statistics for the week were as follows: Arrivals, 1,222 tons; sales, 777 tons; stock, 59,148 tons against 20,084 in 1920. The stock consists of 16,000 tons first latex crêpe; 24,000 tons ribbed smoked sheet; 19,000 tons of inferior grades; a very large proportion of this consists of mouldy sheets.

In Antwerp the stock on hand this day amounts to 1,807 tons. The futures market here remains very quiet with prices about 50 centimes lower. At the close price were: March, 6.10; April, 6.25; May, 6.40; June–February, 6.50.

CRUDE RUBBER ARRIVALS AT ATLANTIC AND PACIFIC PORTS AS STATED BY SHIPS' MANIFESTS

PARAS AND CAUCHO AT NEW YORK

	Fine	Medium	Coarse	Caucho	Pounds Totals
FEBRUARY 27. By the S. S. "Lake Fandon," from Pará.					
General Rubber Co.	.....	.....	.....	.....	36,617
Poel & Kelly	27,193	6,685	.....	.....	33,878
Various	.....	.....	.....	.....	48,059
MARCH 3. By the S. S. "Dunstan" from Pará.					
Meyer & Brown, Inc.	133,380*	.....	.....	.....	133,380
H. A. Astlett & Co.	.....	11,200	.....	.....	11,200
Paul Bertuch	420,007	.....	14,387	.....	434,394
MARCH 3. By the S. S. "Dunstan," from Manáos.					
General Rubber Co.	.....	.....	.....	.....	39,091
Meyer & Brown, Inc.	56,000	.....	.....	.....	56,000
Poel & Kelly	64,196	.....	42,659	{48,501‡ {27,731	183,087§
Various	.....	.....	.....	.....	141,970
MARCH 3. By the S. S. "Dunstan," from Iquitos.					
Various	.....	.....	.....	.....	5,568
MARCH 16. By the S. S. "St. Michael," from Pará.					
Poel & Kelly	37,729	711	45,470	{16,650‡ {33,441	134,001†
General Rubber Co.	.....	.....	.....	.....	76,006
Paul Bertuch	106,704	.....	.....	.....	106,704
MARCH 17. By the S. S. "Socrates," from Pará.					
Thornett & Fehr, Inc.	56,000	.....	.....	.....	56,000
Meyer & Brown, Inc.	59,360*	.....	.....	.....	59,360
H. A. Astlett & Co.	50,000	6,000	.....	22,000	78,000
Poel & Kelly	79,105	5,700	39,800	{6,735‡ {600	131,940†
MARCH 17. By the S. S. "Socrates," from Manáos.					
Meyer & Brown, Inc.	112,000*	.....	44,800	.....	156,800

*Includes medium. ‡Cameta.
†Includes Manáos. §Includes Pará.

PLANTATIONS

(Figured 180 pounds to the bale or case)

	Shipment from:	Shipped to:	Pounds	Totals
FEBRUARY 18. By the S. S. "Santa Cruz," at San Francisco.				
Fred Stern & Co.	Singapore	San Francisco	102,800	102,800
FEBRUARY 19. By the S. S. "Shinsei Maru," at New York.				
Chas. T. Wilson Co., Inc.	Colombo	New York	22,400	
Fred Stern & Co.	Colombo	New York	22,400	
L. Littlejohn & Co., Inc.	Colombo	New York	51,300	
Hood Rubber Co.	Colombo	Watertown	40,320	
Meyer & Brown, Inc.	Colombo	New York	112,000	
Baring Bros.	Colombo	New York	100,800	
Fisk Rubber Co.	Colombo	Chicopee Falls	22,400	371,620
FEBRUARY 19. By the S. S. "Karimata," at New York.				
Alden's Successors, Inc.	Soerabaya	New York	93,960	
L. Littlejohn & Co., Inc.	Soerabaya	New York	16,380	
Various	Soerabaya	New York	11,880	
Thornett & Fehr, Inc.	Batavia	New York	224,000	
Fred Stern & Co.	Batavia	New York	179,200	
Various	Batavia	New York	125,280	
Various	Tjong Priok	New York	111,780	
Various	Sebang	New York	1,141,740	1,904,220
FEBRUARY 23. By the S. S. "Rotterdam," at New York.				
Thornett & Fehr, Inc.	Rotterdam	New York	11,200	
Meyer & Brown, Inc.	Rotterdam	New York	291,200	302,400
FEBRUARY 23. By the S. S. "Costigan," at New York.				
Thornett & Fehr, Inc.	Belawan	New York	91,980	
The Goodyear Tire & Rubber Co.	Belawan	Akron	249,840	
Firestone Tire & Rubber Co.	Singapore	Akron	215,416	
The Goodyear Tire & Rubber Co.	Singapore	Akron	300,338	
Various	Singapore	New York	36,940	
Fred Stern & Co.	Batavia	New York	78,400*	
Aldens' Successors, Inc.	Batavia	New York	32,760	
Winter, Ross & Co.	Batavia	New York	14,580	
Henderson, Forbes & Co.	Batavia	New York	59,220	
Poel & Kelly	Batavia	New York	124,740	
Thornett & Fehr, Inc.	Batavia	New York	134,400	
East Asiatic Co., Inc.	Batavia	New York	60,660	1,399,274
*Includes Singapore				
FEBRUARY 23. By the S. S. "Norman Monarch," at New York.				
Poel & Kelly	London	New York	900	900
FEBRUARY 24. By the S. S. "Bardic," at New York.				
Meyer & Brown, Inc.	London	New York	99,900	
Aldens' Successors, Inc.	London	New York	38,880	138,780

PLANTATIONS—Continued

	Shipment from:	Shipped to:	Pounds.	Totals.
FEBRUARY 24. By the S. S. "Eastern Importer," at New York.				
Firestone Tire & Rubber Co.	Singapore	Akron	101,160	101,160
FEBRUARY 24. By the S. S. "M. S. Dollar," at New York.				
Goschens & Cumliffe	Singapore	New York	135,000	
William Stiles & Co.	Singapore	New York	22,400	
Firestone Tire & Rubber Co.	Singapore	Akron	55,800	
The Goodyear Tire & Rubber Co.	Singapore	Akron	715,680	
Meyer & Brown, Inc.	Singapore	New York	112,000	
General Rubber Co.	Singapore	New York	135,540	
Canadian Consolidated Rubber Co., Limited	Singapore	Toronto	33,660	
Baird Rubber & Trading Co.	Singapore	New York	67,200	
L. Littlejohn & Co., Inc.	Singapore	New York	115,250	1,392,530
FEBRUARY 27. By the S. S. "Nemaha," at New York.				
General Rubber Co.	Colombo	New York	224,480	
Baring Bros.	Colombo	New York	302,400	
L. Littlejohn & Co., Inc.	Colombo	New York	44,800	
Meyer & Brown, Inc.	Colombo	New York	246,400	
The Fisk Rubber Co.	Colombo	Chicopee Falls	22,400	
Various	Colombo	New York	111,380	951,860
MARCH 3. By the S. S. "Eurylochus," at Boston.				
Hood Rubber Co.	Colombo	Watertown	112,000	
Baring Bros.	Colombo	New York	100,800	
Various	Colombo	Boston	56,140	268,940
MARCH 3. By the S. S. "Eurylochus," at New York.				
Baird Rubber Trading Co.	Colombo	New York	246,400	
Meyer & Brown, Inc.	Colombo	New York	112,000	
L. Littlejohn & Co., Inc.	Singapore	New York	248,400	
Irwin-Harrisons & Crosfield, Inc.	Batavia	New York	18,000	
Various	Batavia	New York	33,980	658,780
MARCH 4. By the S. S. "Muncaster Castle," at New York.				
Hood Rubber Co.	Singapore	Watertown	408,130	408,130
MARCH 6. By the S. S. "Peugelly," at New York.				
Meyer & Brown, Inc.	Singapore	New York	11,200	
Various	Singapore	New York	27,320	38,520
MARCH 6. By the S. S. "Saxonia," at New York.				
L. Littlejohn & Co., Inc.	London	New York	134,400	
Various	London	New York	2,580	136,980
MARCH 6. By the S. S. "Algie," at New York.				
L. Littlejohn & Co., Inc.	Colombo	New York	179,200	
Various	Colombo	New York	114,380	293,580
MARCH 7. By the S. S. "Trehawke," at New York.				
L. Littlejohn & Co., Inc.	Colombo	New York	196,400	
Various	Colombo	New York	85,840	282,240
MARCH 7. By the S. S. "Orteric," at Boston.				
Hood Rubber Co.	Colombo	Watertown	33,600	33,600
MARCH 7. By the S. S. "Orteric," at New York.				
Chas. T. Wilson Co., Inc.	Colombo	New York	56,000	
Baird Rubber & Trading Co.	Colombo	New York	235,200	
L. Littlejohn & Co., Inc.	Colombo	New York	148,600	
Meyer & Brown, Inc.	Colombo	New York	56,000	
H. A. Astlett & Co.	Colombo	New York	56,000	551,800
MARCH 11. By the S. S. "Taketoyo Maru," at New York.				
L. Littlejohn & Co., Inc.	Colombo	New York	112,000	
Chas. T. Wilson Co., Inc.	Colombo	New York	22,400	
Baird Rubber & Trading Co.	Colombo	New York	56,000	
H. A. Astlett & Co.	Colombo	New York	95,000	
Various	Colombo	New York	86,840	372,240
MARCH 13. By the S. S. "Nagano Maru," at New York.				
Various	Singapore	New York	275,900	
Irwin-Harrisons & Crosfield, Inc.	Ft Swettenham	New York	24,640	
Meyer & Brown, Inc.	Colombo	New York	224,000	
Chas. T. Wilson Co., Inc.	Colombo	New York	180,800	
J. T. Johnstone & Co., Inc.	Colombo	New York	33,600	
L. Littlejohn & Co., Inc.	Colombo	New York	156,800	
Baird Rubber & Trading Co.	Colombo	New York	17,920	913,660
MARCH 13. By the S. S. "Clearwater," at New York.				
Various	Colombo	New York	98,860	
The Goodyear Tire & Rubber Co.	Belawan	Akron	468,720	
General Rubber Co.	Belawan	New York	84,960	
The Goodyear Tire & Rubber Co.	Singapore	Akron	337,500	
Charles T. Wilson Co., Inc.	Singapore	New York	22,400	
Konig Bros. & Co.	Singapore	New York	5,040	
Various	Penang	New York	4,860	
Winter, Ross & Co.	Batavia	New York	14,580	
Fred Stern & Co.	Batavia	New York	70,800	
East Asiatic Co., Inc.	Batavia	New York	7,380	1,115,100
MARCH 13. By the S. S. "Celtic Prince," at New York.				
The Fisk Rubber Co.	Singapore	Chicopee Falls	33,717	
Boustead & Co.	Singapore	New York	4,320	
Baird Rubber & Trading Co.	Singapore	New York	33,600	
William H. Stiles & Co.	Singapore	New York	224,000	
L. Littlejohn & Co., Inc.	Singapore	New York	183,780	
W. R. Grace & Co.	Singapore	New York	222,660	
East Asiatic Co., Inc.	Singapore	New York	327,600	
Aldens' Successors, Inc.	Singapore	New York	69,480	
Balfour, Williamson & Co.	Singapore	New York	186,660	
Thornett & Fehr, Inc.	Singapore	New York	219,520	
Chas. T. Wilson Co., Inc.	Singapore	New York	22,400	
J. T. Johnstone & Co., Inc.	Singapore	New York	89,600	
Rubber Importers & Dealers Co., Inc.	Singapore	New York	92,700	
A. C. Fox & Co.	Singapore	New York	20,160	
Eastern Rubber Co.	Singapore	New York	79,380	
Poel & Kelly	Singapore	New York	68,580	
Fred Stern & Co.	Singapore	New York	83,000	
The Goodyear Tire & Rubber Co.	Singapore	Akron	272,520	
Firestone Tire & Rubber Co.	Singapore	Akron	198,900	
Canadian Consolidated Rubber Co., Ltd.	Singapore	Montreal	283,320	
Hood Rubber Co.	Singapore	Watertown	60,480	
Meyer & Brown, Inc.	Singapore	New York	134,400	
Various	Singapore	New York	1,011,603	
William H. Stiles & Co.	Penang	New York	49,500	
Various	Penang	New York	266,400	4,238,280
MARCH 16. By the S. S. "Ryndam," at New York.				
Thornett & Fehr, Inc.	Rotterdam	New York	11,200	
L. Littlejohn & Co., Inc.	Rotterdam	New York	56,000	
Meyer & Brown, Inc.	Rotterdam	New York	96,320	
Various	Rotterdam	New York	50,320	213,840
MARCH 16. By the S. S. "Albania," at New York.				
Goldman, Sachs & Co.	London	New York	1,609,380	1,609,380
MARCH 17. By the S. S. "Waaldyk," at New York.				
Aldens' Successors, Inc.	Soerabaya	New York	64,620	
Henderson, Forbes & Co.	Soerabaya	New York	27,900	
Huth & Co.	Soerabaya	New York	17,820	
Weise & Co.	Soerabaya	New York	18,000	
East Asiatic Co., Inc.	Soerabaya	New York	96,480	
Fred Stern & Co.	Soerabaya	New York	13,320	
Meyer & Brown, Inc.	Soerabaya	New York	22,400	
Various	Soerabaya	New York	91,100	
The Goodyear Tire & Rubber Co.	Batavia	Akron	116,100	
Thornett & Fehr, Inc.	Batavia	New York	6,720	
Various	Batavia	New York	28,020	
Weise & Co.	Belawan Deli	New York	18,360	
Fred Stern & Co.	Belawan Deli	New York	380,800	
Various	Belawan Deli	New York	220,500	
Chas. T. Wilson Co., Inc.	Rotterdam	New York	33,600	
Various	T'jong Priok*	New York	112,920	1,268,640
MARCH 18. By the S. S. "Laomedon," at New York.				
William H. Stiles & Co.	Singapore	New York	257,600	
L. Littlejohn & Co., Inc.	Singapore	New York	588,700	
J. T. Johnstone & Co., Inc.	Singapore	New York	76,160	
Baird Rubber & Trading Co.	Colombo	New York	264,320	
Meyer & Brown, Inc.	Colombo	New York	179,200	1,365,980
MARCH 19. By the S. S. "Romeo," at New York.				
Fred Waterhouse Co., Ltd.	Singapore	New York	11,200	
J. T. Johnstone & Co., Inc.	Singapore	New York	107,520	
Fred Stern & Co.	Belawan	New York	22,400	141,120

*Shut out S. S. "Veendyk."

CENTRALS

MARCH 6. By the S. S. "Andrew Jackson," at New York.				
Hagemeyer Trading Co.	Montevideo	New York	6,479	6,479
MARCH 17. By the S. S. "Panama," at New York.				
G. Amsinck & Co., Inc.	Cristobal	New York	1,800	1,800

AFRICANS

FEBRUARY 28. By the S. S. "Sao Vicente," at New York.				
Lawrence Johnson & Co.	Lisbon	New York	8,820	8,820
MARCH 6. By the S. S. "Braga," at New York.				
Various	Havre	New York	330	330
MARCH 12. By the S. S. "Iguassu," at New York.				
Various	Lisbon	New York	248,750	248,750

PONTIANAK

FEBRUARY 19. By the S. S. "Karimata," at New York.				
Various	T'jong Priok	New York	95,100	95,100
FEBRUARY 24. By the S. S. "M. S. Dollar," at New York.				
Various	Singapore	New York	125,700	125,700
MARCH 13. By the S. S. "Celtic Prince," at New York.				
Baring Bros.	Singapore	New York	228,600	
Various	Singapore	New York	235,500	464,100

GUTTA PERCHA

FEBRUARY 21. By the S. S. "Jebba," at New York.				
Various	Sierra Leone	New York	42,900	42,900

GUTTA SIAK

MARCH 13. By the S. S. "Celtic Prince," at New York.				
L. Littlejohn & Co., Inc.	Singapore	New York	52,500	52,500

BALATA

	Shipment from:	Shipped to:	Pounds.	Totals.
FEBRUARY 19. By the S. S. "Sebago," at New York.				
William Schall & Co....	Paramaribo	New York	1,800	1,800
FEBRUARY 22. By the S. S. "Berenice," at New York.				
William Schall & Co....	Paramaribo	New York	3,450	3,450
FEBRUARY 24. By the S. S. "General W. C. Gorgas," at New York.				
G. Amsinck & Co., Inc..	Cristobal	New York	115	115
FEBRUARY 25. By the S. S. "Maraval," at New York.				
South & Central America Commercial Co.....	Bolivar	New York	12,815	
G. Amsinck & Co., Inc..	Bolivar	New York	9,840	22,655
FEBRUARY 25. By the S. S. "Tivives," at New York.				
P. R. Rincorres.....	Cartegena	New York	2,400	2,400
MARCH 2. By the S. S. "Quilpue," at New York.				
Ultramares Corporation.	Guayaquil	New York	3,565	
American Trading Co...	Guayaquil	New York	2,415	
G. Amsinck & Co., Inc..	Guayaquil	New York	3,680	9,660
MARCH 13. By the S. S. "Matura," at New York.				
South and Central America Commercial Co...	Fort of Spain	New York	16,560	16,560
MARCH 16. By the S. S. "Lake Sunapee," at New York.				
Arkell & Douglas, Inc...	Dutch Guiana	New York	20,825	20,825

CUSTOM HOUSE STATISTICS

NEW YORK

IMPORTS

	January 1920 Pounds	January 1920 Value	January 1921 Pounds	January 1921 Value
UNMANUFACTURED—*free:*				
Balata:				
From England	63,928	$45,709	22,501	$18,000
Panama	28,118	11,622	.....	.....
Trinidad	140,903	93,375	72,930	42,587
Colombia	39,208	17,417	7,291	2,970
British Guiana	27,296	22,942	.....	.....
Dutch Guiana	20,267	16,833	13,545	10,546
Venezuela	174,841	84,368	10,879	6,334
Totals	494,561	$292,266	127,146	$80,437
Jelutong (Pontianak):				
From Straits Settlements.	1,008,778	$151,289	170,147	$20,630
Dutch East Indies..	202,554	20,486	.....	.....
Totals	1,211,332	$171,775	170,147	$20,630
Gutta percha:				
From Straits Settlements..	725,660	$120,708	127	$31
Dutch East Indies..	87,869	12,479	.....	.....
British W. Africa..	3,470	555	.....	.....
England	.....	.....	53,200	7,980
Totals	816,999	$133,742	53,327	$8,011
Crude rubber:				
From Belgium	298,903	$90,518	.....	.....
France	490,968	198,476	.....	.....
Netherlands	1,522,588	722,320	100,800	$35,280
Portugal	67,461	33,730	121,000	13,310
England	16,575,904	7,762,677	636,468	178,011
Costa Rica	623	551	.....	.....
Guatemala	942	235	.....	.....
Honduras	446	182	.....	.....
Nicaragua	12,996	3,578	.....	.....
Panama	4,200	1,453	.....	.....
Salvador	2,775	1,422	.....	.....
Mexico	43,441	11,167	.....	.....
Trinidad	9,628	4,836	.....	.....
Haiti	794	272	.....	.....
Bolivia	1,843	449	.....	.....
Brazil	4,233,199	1,405,944	2,432,665	310,032
Colombia	117,609	45,286	117,568	24,548
Ecuador	151,002	37,849	600	86
British Guiana	4,078	1,956	.....	.....
Peru	176,721	65,118	60,681	11,661
Venezuela	724	229	2,335	1,320
British India	282,195	110,812	378,943	108,491
Straits Settlements..	17,757,741	7,440,299	17,471,256	5,607,172
British East Indies.	7,781,126	3,127,447	1,900,643	398,855
Dutch East Indies..	5,592,603	2,445,439	2,521,287	872,617
Japan	175,512	86,564	.....	.....
British W. Africa..	107,663	53,831	.....	.....
Dutch Guiana	.....	.....	11,170	6,718
Turkey in Asia	.....	.....	44,800	13,245
Belgian Congo	.....	.....	60,759	12,267
Portuguese Africa	.....	.....	150	30
Totals	55,413,685	$23,652,640	25,861,125	$7,593,643
Scrap rubber	610,858	53,210	148,096	10,224
Totals, unmanufactured.	58,547,435	$24,303,633	26,359,841	$7,712,945
Manufactures of rubber and gutta percha	.....	55,650	.....	33,045
Chicle ..... *dutiable*	.....	.....	208,417	106,520

	January 1920 Pounds	January 1920 Value	January 1921 Pounds	January 1921 Value
EXPORTS				
MANUFACTURED:				
Belting	.....	$119,441	.....	$235,315
Hose	.....	41,567	.....	469,916
Packing	.....	17,890	.....	119,797
Rubber boots ..... *pairs*	21,842	88,189	12,499	38,189
Rubber shoes ..... *pairs*	951,777	1,000,552	731,008	793,612
Druggists' sundries	.....	60,606	.....	150,351
Automobile tires	.....	2,573,773	.....	1,792,336
Other tires	.....	117,466	.....	62,857
Inner tubes	.....	40,145	.....	121,227
Solid tires	.....	26,920	.....	155,199
Soles and heels	.....	13,787	.....	102,890
Other rubber manufactures..	.....	432,653	.....	552,314
Totals, manufactured....	.....	$4,532,989	.....	$4,594,003
Chewing gum	.....	.....	.....	$114,850
Insulated wire	.....	.....	.....	2,318,553
Fountain pens..... *number*	.....	.....	43,077	66,731
Suspenders and garters....	.....	.....	.....	155,987
Totals	.....	.....	.....	$2,656,121
UNMANUFACTURED—*free:*				
Reclaimed and scrap rubber.	361,108	$48,855	928,023	$69,638
FOREIGN EXPORTS				
Balata	54,958	$32,698	.....	.....
Crude rubber	64,960	25,303	136,687	$34,372
Gutta percha	.....	.....	36,010	4,998
Rubber manufactures	.....	.....	.....	32,512
Rubber substitutes	.....	.....	.....	53

MASSACHUSETTS

IMPORTS

UNMANUFACTURED—*free:*				
Crude rubber:				
From England	472,101	$232,168	.....	.....
British East Indies..	.....	.....	33,600	$7,827
Totals	472,101	$232,168	33,600	$7,827
Reclaimed and scrap rubber.	15,761	1,300	.....	.....
Totals, unmanufactured.	487,862	$233,468	33,600	$7,827
Rubber manufactures. *dutiable*	.....	$2,464	.....	$4,143

EXPORTS

MANUFACTURED:				
Automobile tires	.....	$12,946	.....	$6,776
Inner tubes	.....	569	.....	.....
Belting	.....	1,247	.....	623
Hose	.....	3,767	.....	535
Packing	.....	1,208	.....	71
Rubber boots..... *pairs*	15,775	42,118	3,203	10,113
Rubber shoes..... *pairs*	224,360	177,592	39,785	54,018
Druggists' sundries	.....	749	.....	4,054
Soles and heels	.....	5,524	.....	2,660
Other rubber manufactures..	.....	33,125	.....	22,742
Totals	.....	$278,845	.....	$101,592
Insulated wire	.....	$338	.....	$15,463
Suspenders and garters.....	.....	9,360	.....	263

PHILADELPHIA

IMPORTS

MANUFACTURED:				
Rubber manufactures. *dutiable*	.....	$241	.....	$14

EXPORTS

MANUFACTURED:				
Automobile tires	.....	$18,532	.....	.....
Inner tubes	.....	487	.....	.....
Hose	.....	24,964	.....	$478
Packing	.....	1,412	.....	553
Other rubber manufactures..	.....	239	.....	87
Totals	.....	$45,634	.....	$1,118
Insulated wire	.....	$1,071	.....	$20,276
Suspenders and garters.....	.....	4,172	.....	.....
Rubber scrap and reclaimed..	99,514	6,127	69,065	4,532

NEW ORLEANS

IMPORTS

UNMANUFACTURED—*free:*				
Crude rubber:				
From Nicaragua	5,744	$1,225	.....	.....
Mexico	87,214	43,000	.....	.....
Totals	92,958	$44,225	.....	.....
Chicle ..... *dutiable*	.....	.....	30,263	$16,564

EXPORTS

MANUFACTURED:				
Automobile tires	.....	$1,879	.....	$7,879
Inner tubes	.....	580	.....	925
Solid tires	.....	294	.....	.....
All other tires	.....	368	.....	9
Belting	.....	2,726	.....	190
Hose	.....	1,562	.....	11,288
Packing	.....	428	.....	312
Rubber boots ..... *pairs*	96	133	12	50
Rubber shoes ..... *pairs*	7,874	9,354	21,004	33,856
Soles and heels	.....	367	.....	109
Druggists' sundries	.....	156	.....	549
Other rubber manufactures..	.....	2,895	.....	682
Totals	.....	$20,742	.....	$55,849

	January			
	1920		1921	
	Pounds	Value	Pounds	Value
Insulated wire	.....	$2,634	.....	$4,140
Fountain pens .....*number*	48	45	.....	.....
Suspenders and garters.....	.....	1,338	.....	848
Chewing gum	.....	.....	.....	1,636

SAN FRANCISCO

IMPORTS

UNMANUFACTURED—*free:*				
Crude rubber:				
From Salvador	650	$325	.....	.....
Straits Settlements...	1,888,998	721,786	56,080	$8,255
Dutch East Indies....	78,851	27,606	51,239	11,618
British East Indies...	.....	.....	5,928	922
Hong Kong	374	177	.....	.....
Totals	1,968,873	$749,894	113,247	$20,795
Rubber manufactures..*dutiable*	.....	$1,331	.....	$160
Chicle .....*dutiable*	.....	.....	80	24

EXPORTS

MANUFACTURED:				
Automobile tires	.....	$112,094	.....	$45,205
Inner tubes	.....	8,756	.....	6,282
Solid tires	.....	30,762	.....	7,267
All other tires	.....	1,687	.....	596
Belting	.....	22,407	.....	24,020
Hose	.....	7,158	.....	6,328
Packing	.....	7,805	.....	8,848
Rubber boots .....*pairs*	51	145	2,985	10,160
Rubber shoes .....*pairs*	2,347	2,166	717	858
Soles and heels	.....	1,074	.....	41
Druggists' sundries	.....	4,132	.....	947
Other rubber manufactures...	.....	12,040	.....	9,102
Totals	.....	$210,226	.....	$119,654
Insulated wire	.....	$3,033	.....	$7,887
Fountain pens .....*number*	22	58	3	18
Suspenders and garters.....	.....	3,037	.....	1,761
Chewing gum	.....	6,072	.....	2,042
Rubber scrap and reclaimed.	431,937	21,011	.....	.....

FOREIGN EXPORTS

Crude rubber	170	$20	.....	.....

WASHINGTON

IMPORTS

UNMANUFACTURED—*free:*				
Crude rubber:				
From Canada	2,585	$1,034	.....	.....
Straits Settlements...	3,589,979	1,399,824	67,200	12,096
Japan	463,764	230,479	.....	.....
Totals	4,056,328	$1,631,337	67,200	$12,096
Rubber manufactures..*dutiable*	.....	$426	.....	$17

EXPORTS

MANUFACTURED:				
Automobile tires	.....	$2,820	.....	$3,629
Inner tubes	.....	161	.....	266
Solid tires	.....	1,555	.....	5,407
Other tires	.....	.....	.....	63
Belting	.....	28,111	.....	3,289
Hose	.....	581	.....	1,843
Packing	.....	695	.....	207
Rubber boots .....*pairs*	603	2,469	312	901
Rubber shoes .....*pairs*	2,928	2,669	294	333
Druggists' sundries	.....	1,003	.....	108
Other rubber manufactures..	.....	2,581	.....	4,312
Totals	.....	$42,645	.....	$20,358
Insulated wire	.....	$382	.....	$2,003
Fountain pens .....*number*	2	6	.....	.....
Suspenders and garters.....	.....	752	.....	4
Chewing gum	.....	.....	.....	1,460
Rubber scrap and reclaimed..	343,412	15,480	6,524	288

FOREIGN EXPORTS

Crude rubber	.....	.....	123,000	$24,600

BUFFALO

IMPORTS

Rubber scrap and reclaimed..	.....	.....	17,080	$193
Rubber manufactures..*dutiable*	.....	.....	.....	1,229

EXPORTS

MANUFACTURED:				
Automobile tires	.....	.....	.....	$17,961
Inner tubes	.....	.....	.....	4,570
Solid tires	.....	.....	.....	2,876
All other tires	.....	.....	.....	1,967
Belting	.....	.....	.....	2,689
Hose	.....	.....	.....	1,954
Packing	.....	.....	.....	2,453
Rubber boots	.....	.....	32	129
Druggists' sundries	.....	.....	.....	10,667
Other rubber manufactures...	.....	.....	.....	45,697
Totals	.....	.....	.....	$90,963
Insulated wire	.....	.....	.....	$8,165
Fountain pens.....*number*	.....	.....	823	895
Suspenders and garters.....	.....	.....	.....	645
Rubber scrap and reclaimed.	.....	.....	30,500	4,309

FOREIGN EXPORTS

Crude rubber	.....	.....	746,991	$146,534

CHICAGO

IMPORTS

Rubber scrap and reclaimed..	56,923	$3,782	.....	.....
Chicle .....*dutiable*	511,716	343,884	579,224	$305,536
Rubber manufactures..*dutiable*	.....	1,887	.....	1,209

OHIO

IMPORTS

UNMANUFACTURED—*free:*				
Crude rubber:				
From Dutch East Indies...	499,865	$211,724	.....	.....
Totals	499,865	$211,724	.....	.....
Rubber manufactures..*dutiable*	.....	.....	.....	$523

RUBBER STATISTICS FOR THE DOMINION OF CANADA

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	December			
	1919		1920	
	Pounds	Value	Pounds	Value
UNMANUFACTURED—*free:*				
Balata:				
From United States.....	43	$63	.....	.....
Rubber, gutta percha, etc.:				
From United Kingdom	702,539	381,687	151,726	$40,850
United States.....	1,065,886	567,667	1,040,464	179,121
Brazil	.....	.....	46,090	11,943
British East Indies:				
Ceylon	452,529	281,730	.....	.....
Straits Settlements.	329,491	180,089	1,050,258	324,265
Dutch East Indies...	.....	.....	22,129	10,933
Other countries.....	.....	.....	22,746	8,747
Totals	2,550,488	$1,411,236	2,333,413	$575,859
Rubber, recovered	352,234	41,429	25,584	5,107
Rubber, powdered and rubber or gutta percha scrap.....	141,297	8,831	157,764	17,351
Rubber substitute	108,502	14,073	127,873	17,605
Totals, unmanufactured..	3,152,521	$1,475,569	2,644,634	$615,922
PARTLY MANUFACTURED—				
Hard rubber sheets and rods.	16,092	$9,411	1,328	$710
Hard rubber tubes	.....	4,939	.....	4,114
Rubber thread, not covered..	2,589	3,861	563	838
Totals, partly manufactured	18,681	$18,211	1,891	$5,660
MANUFACTURED—				
Belting	.....	$18,668	.....	$16,432
Hose	.....	12,766	.....	12,679
Packing	.....	7,682	.....	5,015
Boots and shoes	.....	16,795	.....	9,652
Clothing, including waterproofed	.....	20,007	.....	21,479
Gloves	.....	1,423	.....	1,265
Hot water bottles	.....	6,544	.....	1,977
Tires, solid	.....	16,006	.....	8,951
Tires, pneumatic	.....	91,463	.....	162,484
Tires, inner tubes	.....	6,265	.....	15,976
Elastic, round or flat	.....	30,164	.....	24,703
Mats and matting	.....	127	.....	58
Cement	.....	2,939	.....	4,777
Other rubber manufactures..	.....	109,149	.....	98,919
Totals, manufactured	.....	$339,998	.....	$384,367
Totals, rubber imports...	3,171,202	$1,833,778	2,646,525	$1,005,949
Insulated wire and cables:				
Wire and cables covered with cotton, linen, silk, rubber, etc.	.....	$11,333	.....	$21,282
Copper wire and cables, covered as above	.....	10,011	.....	8,905
Chicle	310,636	260,299	44,924	20,429
Fillets	.....	818	.....	.....
Webbing	.....	52,017	.....	10,063
Fountain pens	.....	6,525	.....	3,771

EXPORTS OF DOMESTIC AND FOREIGN RUBBER GOODS

	December			
	1919		1920	
	Produce of Canada Value	Reexports of Foreign Goods Value	Produce of Canada Value	Reexports of Foreign Goods Value
UNMANUFACTURED—				
Crude and waste rubber.....	$26,792	.....	$2,256	.....
MANUFACTURED—				
Belting	663	.....	5,155	.....
Hose	17,740	.....	31,513	.....
Boots and shoes	235,291	$686	291,851	.....
Clothing, including waterproofed	6,056	.....	3,657	$254
Tires, pneumatic	835,318	.....	665,433	.....
Tires	2,968	1,675	13,072	25
Other manufactures	20,337	2,924	65,187	4,800
Totals, manufactured....	$1,118,373	$5,285	$1,075,868	$5,079
Totals, rubber exports....	$1,145,165	$5,285	$1,078,124	$5,079
Insulated wire and cable:				
Copper wire and cable....	$24,739	.....	$126,734	.....

EXPORTS OF INDIA RUBBER MANUFACTURES AND INSULATED WIRE AND CABLE FROM THE UNITED STATES BY COUNTRIES, DURING THE MONTH OF DECEMBER, 1920

EXPORTED TO—	Belting	Hose	Packing	Boots		Shoes		Soles and	Automobile Tires				Insulated	Druggists'	All Other	
EUROPE:	Value	Value	Value	Pairs	Value	Pairs	Value	Heels Value	Casings Value	Inner Tubes Value	Solid Tires Value	All Others Value	Wire and Cables Value	Rubber Sundries Value	Manufactures of Rubber Value	Totals Value
Austria	.....	.....	.....	.....	.....	2,136	$2,200	.....	.....	.....	.....	$49	.....	.....	.....	$2,249
Azores and Madeira Islands	.....	.....	.....	.....	.....	.....	.....	$36	$80	$16	.....	.....	.....	.....	.....	132
Belgium	$2,263	$272	$635	72	$260	22,946	28,522	.....	152,937	3,662	.....	.....	$4,028	$231	$8,206	201,016
Bulgaria	.....	4,994	.....	.....	.....	8,208	10,199	.....	.....	.....	$339	.....	.....	.....	.....	15,532
Denmark	699	732	.....	100	400	24,892	31,633	.....	17,891	1,526	.....	1,297	11,014	160	3,056	68,378
Finland	380	1,226	.....	.....	.....	6,390	6,890	.....	17,144	2,052	452	.....	160	.....	700	29,004
France	5,525	.....	.....	.....	.....	24,072	24,072	.....	90,488	26,010	.....	.....	13,946	4,732	37,393	202,166
Germany	3,389	5	.....	.....	.....	6,000	9,108	.....	1,613	211	.....	.....	610	644	1,124	16,704
Gibraltar	.....	.....	.....	.....	.....	504	550	.....	.....	.....	.....	.....	.....	.....	.....	$50
Greece	.....	2,380	577	.....	.....	4,824	6,266	.....	24,372	4,125	.....	.....	6,366	150	400	44,636
Italy	2,075	.....	.....	5	35	2,376	2,380	216	46,621	9,511	.....	.....	4,345	843	151	66,177
Netherlands	896	4,771	113	.....	.....	24,074	27,417	300	140,227	7,296	3,036	.....	46,200	7,338	6,606	244,200
Norway	11,755	2,257	300	148	529	159,104	149,670	.....	61,924	6,297	7,628	.....	7,270	958	5,443	254,031
Poland and Danzig	.....	.....	.....	.....	.....	.....	.....	.....	3,503	465	.....	.....	8,818	.....	5,000	17,786
Portugal	.....	150	8	.....	.....	3,108	2,857	.....	7,683	1,390	.....	.....	6,808	245	132	19,273
Roumania	.....	8,209	20	.....	.....	16,978	21,159	16	3,887	.....	847	.....	394	36	35	34,603
Russia in Europe	.....	.....	.....	.....	.....	.....	.....	.....	6,379	2,847	.....	.....	.....	.....	.....	9,226
Spain	3,461	4,975	24	.....	.....	1,656	1,401	.....	168,573	8,629	4,620	1,941	18,121	1,396	12,560	225,701
Sweden	2,394	563	.....	492	1,440	156	690	.....	31,067	3,340	.....	.....	4,238	1,127	6,880	51,739
Switzerland	2,928	346	.....	.....	.....	43,920	45,591	320	3,944	494	.....	727	13,131	110	943	68,534
Turkey in Europe	.....	2,380	.....	.....	.....	33,475	36,219	.....	41,336	812	.....	.....	.....	518	16	81,281
England	10,474	78,339	13,545	1,056	2,531	38,126	35,925	18,160	393,203	24,976	36,398	1,991	87,879	27,923	159,954	891,298
Scotland	1,410	189	13,786	144	279	5,448	5,901	.....	5,950	32	.....	.....	5	.....	1,605	29,157
Ireland	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,683	2,683
Yugoslavia, Albania, etc	.....	.....	.....	.....	.....	.....	.....	.....	993	49	.....	.....	.....	.....	.....	1,042
TOTALS, EUROPE	$47,619	$111,788	$29,008	2,017	$5,474	428,393	$448,650	$19,048	$1,219,815	$103,740	$53,320	$6,005	$233,333	$46,411	$252,887	$2,577,098
NORTH AMERICA:																
Bermuda	$505	$275	$12	2	$7	1,041	$1,671	$587	.....	.....	.....	$178	$1,581	$326	$226	$5,368
British Honduras	.....	142	12	7	28	2,227	3,668	.....	$253	$7	.....	56	205	33	18	4,422
Canada	17,509	12,826	6,630	1,719	7,763	1,876	3,142	.....	270,982	79,454	$20,941	592	24,268	23,487	89,253	556,847
Costa Rica	437	166	.....	.....	.....	488	535	672	1,219	220	.....	.....	3,150	1,083	524	7,806
Guatemala	768	1,302	270	.....	.....	3,001	3,819	1,744	1,396	50	.....	622	1,564	581	241	12,357
Honduras	469	927	87	.....	.....	304	578	586	1,547	10	.....	51	137	786	3,437	8,615
Nicaragua	1,479	2,414	155	.....	.....	938	1,463	471	1,806	816	.....	.....	1,462	371	211	10,648
Panama	4,710	9,753	1,629	.....	.....	6,422	12,318	3,332	16,919	1,732	6,560	558	6,341	1,528	3,087	68,467
Salvador	.....	344	411	.....	.....	.....	.....	1,557	3,671	6,413	1,918	.....	26	325	159	14,824
Mexico	48,566	67,134	45,313	214	1,155	17,497	22,480	8,184	122,462	20,901	10,511	3,114	166,450	17,404	53,685	587,359
Miquelon, Langley, etc	.....	.....	.....	.....	.....	240	222	.....	.....	.....	.....	.....	.....	.....	.....	222
Newfoundland and Labrador	.....	1,243	45	1,745	5,791	461	232	1,569	55	7	.....	.....	4,160	191	296	13,589
Barbados	.....	.....	50	.....	.....	501	633	.....	2,366	179	.....	.....	286	15	646	4,175
Jamaica	576	852	767	.....	.....	5,478	7,255	274	43,484	1,975	269	25	277	618	3,686	60,058
Trinidad and Tobago	1,925	3,782	1,854	.....	.....	8,643	8,312	788	26,272	1,261	4,952	.....	1,238	879	4,140	55,403
Other British West Indies	56	576	260	.....	.....	7,911	9,379	85	3,206	116	177	467	2,909	72	534	17,837
Cuba	16,515	39,956	28,291	104	457	132,382	138,946	5,558	65,661	12,167	37,906	3,775	127,830	28,384	57,828	563,274
Virgin Islands of U. S.	.....	14	166	.....	.....	1,584	3,101	226	869	25	.....	93	542	113	172	5,321
Dutch West Indies	.....	.....	17	.....	.....	516	648	244	2,093	194	.....	20	1,172	35	348	4,771
French West Indies	694	56	.....	.....	.....	36	65	.....	9,594	1,244	4,374	96	.....	.....	149	16,272
Haiti	152	234	.....	.....	.....	501	892	189	8,065	1,673	.....	66	810	252	1,010	13,353
Dominican Republic	838	1,868	2,068	.....	.....	814	1,307	819	17,589	3,542	3,997	662	7,730	1,587	10,721	52,728
TOTALS, NORTH AMERICA	$95,009	$143,864	$88,037	3,791	$15,201	192,861	$220,666	$26,885	$599,509	$131,986	$91,605	$10,375	$352,138	$78,070	$230,371	$2,083,716
OCEANIA:																
Australia	$9,785	$10,430	$2,855	.....	.....	360	$304	.....	$88,834	$2,489	$500	$150	$17,593	$3,191	$22,515	$158,646
New Zealand	21,900	2,403	2,446	.....	.....	264	292	$1,914	195,816	9,238	4,875	703	19,012	1,388	15,128	275,115
Other British Oceania	.....	.....	.....	.....	.....	24	25	.....	200	.....	.....	.....	.....	.....	103	328
French Oceania	.....	32	107	.....	.....	.....	.....	.....	300	16	605	27	23	.....	134	1,244
Philippine Islands	14,659	7,698	5,605	1,668	3,980	65,265	93,175	12,896	182,825	25,535	30,175	4,099	103,191	4,345	27,074	515,257
TOTALS, OCEANIA	$46,344	$20,563	$11,013	1,668	$3,980	65,913	$93,796	$14,810	$467,975	$37,278	$36,155	$4,979	$139,819	$8,924	$64,954	$950,590
SOUTH AMERICA:																
Argentina	$25,735	$11,874	$1,527	.....	.....	48,071	$49,507	$1,722	$222,477	$27,039	$750	$3,743	$62,400	$9,892	$41,056	$457,722
Bolivia	3,468	360	129	.....	.....	.....	.....	.....	2,097	31	.....	841	1,130	5	1,339	9,400
Brazil	13,731	27,136	3,967	114	$643	17,496	17,925	19,088	128,867	5,096	2,928	480	303,612	8,869	32,129	564,471
Chile	29,663	30,164	3,943	1,584	7,461	6,130	6,849	.....	40,668	3,483	178	.....	25,428	1,650	12,969	162,456
Colombia	.....	3,133	582	.....	.....	3,554	5,331	2,015	9,138	1,145	.....	1,440	13,456	3,407	2,756	42,403
Ecuador	.....	633	110	.....	.....	.....	.....	.....	5,246	329	.....	.....	3,247	805	1,492	11,862
Falkland Islands	770	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	770
British Guiana	.....	1,781	78	.....	.....	4,275	6,083	.....	3,791	226	.....	.....	5,594	331	1,221	19,105
Dutch Guiana	.....	792	.....	.....	.....	248	342	120	289	.....	.....	.....	219	90	520	2,372
French Guiana	.....	320	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	224	554
Paraguay	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	278	278
Peru	23,679	18,249	1,842	86	716	9,111	10,082	79	20,719	4,748	3,365	200	55,124	1,410	5,979	146,192
Uruguay	2,000	4,184	2	.....	.....	15,279	15,433	.....	88,861	3,411	.....	492	7,897	3,073	5,409	130,762
Venezuela	334	831	657	.....	.....	96	89	300	10,345	2,635	98	51	10,923	3,401	3,721	33,385
TOTALS, SOUTH AMERICA	$99,380	$99,457	$12,837	1,784	$8,820	104,260	$111,641	$23,324	$532,498	$48,143	$7,319	$7,247	$489,030	$32,933	$109,093	$1,581,722

EXPORTED TO—	Belting Value	Hose Value	Packing Value	Boots Pairs	Boots Value	Shoes Pairs	Shoes Value	Soles and Heels Value	Automobile Tires: Casings Value	Automobile Tires: Inner Tubes Value	Automobile Tires: Solid Tires Value	Automobile Tires: All Others Value	Insulated Wire and Cables Value	Druggists' Rubber Sundries Value	All Other Manufactures of Rubber Value	Totals Value
Asia:																
China	$1,196	$8,405	$4,367	36	$147	2,485	$2,869	....	$32,772	$6,379	....	....	$67,618	$3,333	$10,991	$138,077
Chosen	3,020	....	....	....	....	....	....	....	....	....	....	....	....	285	....	3,305
British India	6,706	3,971	1,129	....	....	6,471	11,668	$50	61,749	6,054	$170	$495	1,715	4,368	6,394	104,469
Straits Settlements	6,904	288	353	....	....	5,280	6,784	35	3,338	81	3,327	1,619	6,051	150	2,413	31,343
Other British East Indies	....	....	103	....	....	360	473	....	1,120	343	....	....	....	....	63	2,102
Dutch East Indies	2,079	705	2,396	....	....	480	550	....	36,632	5,090	47,690	....	4,800	350	3,104	103,396
French Indo China	....	....	....	....	....	....	....	....	....	....	98	....	139	....	....	237
Hongkong	....	2,349	600	....	....	1,110	2,118	....	8,573	2,336	2,409	225	113	3,210	310	22,243
Japan	11,496	282	550	1,608	5,073	36,772	39,779	....	28,711	596	2,100	....	2,955	240	29,670	121,452
Persia	....	....	....	....	....	12	14	....	....	....	....	....	....	....	....	14
Siam	....	....	....	....	....	....	....	....	....	....	....	....	....	198	937	1,135
Turkey in Asia	388	250	....	....	....	2,404	2,482	28	2,523	380	....	....	158	....	652	7,361
Totals, Asia	$31,789	$16,250	$9,498	1,644	$5,220	55,374	$66,737	$113	$175,418	$21,759	$55,794	$2,339	$83,549	$12,134	$54,534	$535,134
Africa:																
Belgian Kongo	....	....	$350	....	....	....	....	....	$1,194	$173	....	....	....	....	....	$1,717
British West Africa	....	....	1,800	....	....	244	$544	....	75,243	4,089	$334	....	....	$204	$366	82,580
British South Africa	$136,648	$51,239	11,877	....	....	7,327	8,270	$1,598	159,528	17,671	....	....	$3,438	3,760	30,850	424,879
British East Africa	....	....	....	....	....	....	....	....	9,349	252	....	....	....	....	145	9,746
Canary Islands	....	....	....	....	....	....	....	....	2,832	53	....	....	....	....	....	2,885
French Africa	34,736	....	55	....	....	....	....	....	1,797	....	....	....	....	....	....	36,588
Kamerun, etc.	....	....	....	....	....	....	....	....	5,221	673	....	....	....	....	....	5,894
Morocco	....	....	....	....	....	....	....	....	640	....	....	....	....	....	....	640
Portuguese Africa	....	325	138	24	$104	....	....	....	....	....	....	....	....	....	234	801
Egypt	....	124	....	....	....	....	....	140	13,692	651	....	....	....	462	543	15,612
Totals, Africa	$171,384	$51,688	$14,220	24	$104	7,571	$8,814	$1,738	$269,496	$23,562	$334	....	$3,438	$4,426	$32,138	$581,342
Totals	$491,525	$443,610	$164,613	10,928	$38,799	854,372	$950,304	$85,918	$3,264,711	$366,468	$244,527	$30,945	$1,301,307	$182,898	$743,977	$8,309,602

EXPORTS OF RUBBER GOODS TO NON-CONTIGUOUS TERRITORY OF THE UNITED STATES

	Belting, Hose and Packing Value	Boots and Shoes Pairs	Boots and Shoes Value	Tires: Automobile Value	Tires: All Others Value	Insulated Wire and Cables Value	Druggists' Rubber Sundries Value	All Other Manufactures of Rubber Value	Totals Value
Hawaii	$25,510	....	....	$60,325	$1,856	....	....	$15,634	$103,325
Porto Rico	13,045	....	....	165,862	1,026	....	....	85,373	265,306
Totals	$38,555	....	....	$226,187	$2,882	....	....	$101,007	$368,631

Compiled by the Bureau of Foreign Commerce, Department of Commerce, Washington, D. C.

F. M. S. RUBBER EXPORTS, 1915-1919

Pará rubber exports from the Federated Malay States during the last five years are indicated in the appended table according to quantity and value:

Years	Tons	Value	Years	Tons	Value
1915	44,523	$46,702,994	1918	78,283	$58,130,969
1916	62,764	73,796,711	1919	106,453	96,039,555
1917	79,831	94,503,117			

Details of the export trade in cultivated rubber of the Federated Malay States during 1918 and 1919 are stated in the next table:

Destinations	1918 Tons	1919 Quantity Tons	1919 Value	Increase (+) or Decrease (—) in Quantity Tons
Straits Settlements	70,668	87,645	$79,054,906	+16,977
United Kingdom	6,187	17,531	15,802,320	+11,344
Continental Europe	85	....	....	—85
Ceylon	222	809	734,946	+587
All other countries	1,121	468	447,383	—653
Total	78,283	106,453	$96,039,555	+28,170

UNITED KINGDOM RUBBER STATISTICS

IMPORTS

	December 1919 Pounds	December 1919 Value	December 1920 Pounds	December 1920 Value
Unmanufactured— Crude rubber: From—				
Straits Settlements	5,420,000	£633,641	5,324,500	£287,453
Federated Malay States	6,352,000	753,366	3,335,100	191,921
British India	1,490,800	180,042	892,500	53,132
Ceylon and dependencies	4,391,300	519,123	4,135,400	233,547
Other Dutch possessions in Indian Seas	1,028,400	127,745	662,500	44,213
Dutch East Indies (except other Dutch possessions in Indian Seas)	1,480,400	172,949	2,704,800	151,827
Other countries in the East Indies and Pacific not elsewhere specified	361,800	42,446	17,200	939
Brazil	1,277,800	154,993	116,700	7,083
Peru	21,600	2,510	......	....
South and Central America (except Brazil and Peru)	13,300	1,279	16,500	790
West Africa:				
Gold Coast	48,000	3,156	31,900	2,163
Other parts of West Africa	278,100	21,208	68,200	3,548
East Africa (including Madagascar)	44,400	4,925	....	....
Other countries	314,900	36,461	101,800	5,476
Totals	22,523,200	£2,653,844	17,407,100	£982,092
Waste and reclaimed rubber	696,600	20,123	67,600	1,796
Totals, unmanufactured	23,219,800	£2,673,967	17,474,700	£983,888
Gutta percha and balata	1,462,400	£240,870	1,397,700	£282,646
*Rubber substitutes	......	......	19,700	566
Manufactured—				
Boots and shoes..*dozen pairs*	14,096	£27,055	6,131	£29,166
Waterproof clothing	......	3,809	......	1,250
Insulated wire	......	356	......	4,137
Tires and tubes	......	336,362	......	419,093
Other rubber manufactures	......	57,880	......	74,356

EXPORTS

	1919 Pounds	1919 Value	1920 Pounds	1920 Value
Unmanufactured—				
Waste and reclaimed rubber	967,900	£23,146	520,800	£14,154
*Rubber substitutes	......	......	47,000	3,151
Manufactured—				
Boots and shoes..*dozen pairs*	15,167	£34,504	12,979	£27,329
Waterproof clothing	......	247,702	......	137,437
Insulated wire	......	97,487	......	166,072
Submarine cables	......	78,070	......	326,295
Tires and tubes	......	400,482	......	417,639
Other rubber manufactures	......	292,851	......	330,669

EXPORTS—COLONIAL AND FOREIGN

	1919 Pounds	1919 Value	1920 Pounds	1920 Value
Unmanufactured— Crude rubber:				
To Russia	10,100	£820	11,400	£856
Sweden, Norway and Denmark	376,800	40,951	385,400	23,020
Germany	429,400	42,250	1,011,800	54,351
Belgium	727,400	77,126	196,700	12,378
France	1,971,000	226,305	719,800	44,097
Spain	41,600	5,222	53,900	3,539
Italy	514,900	53,787	270,900	20,169
Austria-Hungary	......	......	22,400	1,190
Other European countries	302,000	30,617	267,000	15,800
United States	14,132,000	1,707,452	78,500	9,573
Canada	537,600	74,752	248,000	16,645
Other countries	173,900	22,248	22,300	1,280
Totals, rubber	19,216,700	£2,281,530	3,288,100	£202,898
Waste and reclaimed rubber	87,900	£3,222	......	......
Gutta percha and balata	321,300	51,207	32,300	£6,396

UNITED KINGDOM RUBBER STATISTICS—Continued

	Year Ended December 31 1920 Pounds	1920 Value	1921 Pounds	1921 Value
MANUFACTURED—				
Boots and shoes..*dozen pairs*	143	£414	1,169	£4,112
Waterproof clothing	.....	34	.....	296
Tires and tubes	.....	1,743	.....	82,193
Other manufactures	.....	3,043	.....	2,785

*Included in "Other Articles," Class III, T., prior to 1920.

RUBBER STATISTICS FOR ITALY

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	Eight Months Ended August 1919 Quintals[1]	1919 Lire[2]	1920 Quintals	1920 Lire
UNMANUFACTURED—				
Crude rubber and gutta percha —raw and reclaimed:				
From Great Britain	57		654	
French Asian Colony	97		2,075	
India and Ceylon	20,252		5,849	
Straits Settlements	33,955	77,305,100	22,972	44,018,250
French African Colonies	2,818		1,000	
Belgian Congo	574		1,865	
Brazil	22,763		9,870	
Other countries	860		2,070	
Totals	81,376	77,305,100	46,355	44,018,250
Rubber scrap	14.679	2,201,850	136	20,400
Totals, unmanufactured	96,055	79,506,950	46,491	44,038,650
MANUFACTURED—				
India rubber and gutta percha—				
Threads	169	490,100	237	687,300
Sheets, including hard rubber	112	218,000	223	2,323,800
Tubes	149	210,850	144	294,050
Belting	344	551,100	524	864,600
Rubber-coated fabrics in pieces	409	863,800	642	1,254,800
Boots and shoes.....*pairs*	33,372	667,440	104,608	2,092,160
Elastic webbing	248	843,200	352	1,196,800
Clothing and articles for travel	2	8,000	146	584,000
Tires and tubes—				
From Belgium	.....		668	
France	3,237		4,148	
Great Britain	807	11,331,600	6,698	35,870,800
United States	2		1,264	
Other countries	1		33	
Other manufactures	10,739	20,184,500	15,101	28,257,400
Totals, manufactured	.....	35,368,590	.....	73,425,710
Total imports	.....	114,875,540	.....	117,464,360

EXPORTS OF CRUDE AND MANUFACTURED RUBBER

UNMANUFACTURED—				
India rubber and gutta percha— raw and reclaimed:				
To Austria	.....		300	
Spain	1,985	1,006,800	708	2,228,000
United States	1,371		2,904	
Other countries	.....		544	
Totals	3,356	1,006,800	4,456	2,228,000
Waste	2,093	418,600	6,576	1,315,200
Totals, unmanufactured	5,449	1,425,400	11,032	3,543,200
MANUFACTURED—				
India rubber and gutta percha—				
Threads	367	1,137,700	251	778,100
Sheets, including hard rubber	60	131,000	238	434,900
Tubes	594	855,250	1,200	1,557,200
Belting	95	199,500	.....	.....
Rubber-coated fabrics in pieces	164	492,000	382	839,600
Boots and shoes.....*pairs*	.....	.....	495	9,900
Other footwear	.....	.....	2	3,000
Elastic webbing	491	1,865,800	924	3,511,200
Clothing and articles for travel.	17	85,000	321	1,605,000
Tires and tubes:				
To Austria	50		2,212	
Belgium	828		1,525	
Czecho-Slovakia	262		1,032	
Denmark	130		1,309	
France	377		1,946	
Great Britain	2,708		7,965	
Netherlands	142		432	
Rumania	1		1,156	
Spain	285		796	
Switzerland	82	20,080,000	669	91,265,000
Hungary	.....		265	
India and Ceylon	545		4,089	
Dutch East Indies	.....		1,746	
Straits Settlements	140		2,184	
Australia	242		684	
Argentina	736		2,245	
Brazil	669		1,981	
Other countries	835		4,270	
Other manufactures	1,364	2,573,000	9,026	16,651,800
Totals, manufactured	.....	28,090,450	.....	116,655,700
Total exports	.....	29,515,850	.....	120,198,900

[1]One quintal equals 220.46 pounds.
[2]One lira equals $0.193 (normal).

THE MARKET FOR RUBBER SCRAP

NEW YORK

THE RUBBER SCRAP TRADE continues utterly stagnant owing to the continuation of manufacturing inactivity in the rubber industry. There have been no purchases of scrap by either dealers or reclaimers for months. The plants of the latter are still closed and will not resume production until the demand for rubber goods revives in marked degree. This state of affairs effectually shuts out the scrap trade for the same indefinite period.

The feature of the past month in rubber scrap circles was the annual meeting of the National Association of Waste Material Dealers. The sessions of the Scrap Rubber Division were chiefly concerned with the effect of the present high railroad freight rates as a bar to the free movement of low price scrap when demand revives.

QUOTATIONS FOR CARLOAD LOTS DELIVERED

Prices subject to change without notice

MARCH 26, 1921

BOOTS AND SHOES:			
Arctic tops	*lb.*	*$0.075 @	
Boots and shoes	*lb.*	*.03¼ @	.04¼
Trimmed arctics	*lb.*	*.02¼ @	.03
Untrimmed arctics	*lb.*	*.02 @	.02¼
HARD RUBBER:			
Battery jars, black compound	*lb.*	*.07½ @	.01
No. 1, bright fracture	*lb.*	.18 @	.20
INNER TUBES:			
No. 1	*lb.*	*.07 @	.08
Compounded	*lb.*	*.05 @	.05¼
Red	*lb.*	*.04½ @	.05
MECHANICALS:			
Black scrap, mixed, No. 1	*lb.*	*.02½ @	.03
No. 2	*lb.*	*.01½ @	.02
Car springs	*lb.*	*.02½ @	.03
Heels	*lb.*	*.02½ @	.03
Horse-shoe pads	*lb.*	*.02½ @	.03
Hose, air brake	*lb.*	*.01 @	.01½
fire, cotton lined	*lb*	*.01 @	
garden	*lb.*	*.07½ @	.01
Insulated wire stripping, free from fiber	*lb.*	*.01½ @	.02
Matting	*lb.*	*.01 @	
Red packing	*lb.*	*.04½ @	.05
Red scrap, No. 1	*lb.*	*.07 @	.08
No. 2	*lb.*	*.05½ @	.06
White scrap, No. 1	*lb.*	*.07 @	.07½
No. 2	*lb.*	*.06 @	.06½
TIRES:			
PNEUMATIC—			
Auto peelings	*lb.*	*.02½ @	.02¾
Bicycle	*lb.*	*.01½ @	.02
Standard white auto	*lb.*	*.02½ @	.03
Mixed auto	*lb.*	*.01¼ @	.01¾
Stripped, unguaranteed	*lb.*	*.01 @	.01½
White, G. & G., M. & W., and U. S.	*lb.*	*.03 @	
SOLID—			
Carriage	*lb.*	*.02½ @	.03
Irony	*lb.*	@	
Truck, clean	*lb.*	*.01¾ @	.02¼

*Nominal.

THE MARKET FOR COTTON AND OTHER FABRICS

AMERICAN COTTON. The spot market for middling upland cotton has continued to decline during the past month. With minor fluctuations, quotations ranged from 11.65 cents on March 1, to 12.35 cents on March 24, when the market firmed up and prices advanced. The indications are that in the absence of a more general demand the market will continue to be unsettled.

EGYPTIAN COTTON. Prices have recently shown a great deal of strength, due no doubt to government buying, a prospective sharp reduction in acreage and recent heavy rains which have

necessitated the resowing of practically all cotton which had been put into the ground. It is reported that the Egyptian Government will buy from farmers up to an amount not to exceed two million cantars, which is practically one-third of all the cotton raised in Egypt last year. This government buying was started in order to help small cultivators who have been unable to dispose of any of their last season's crop. It is understood that the buying is only of a limited quantity from each cultivator. Upper Egypts show an advance of about 5 cents a pound from the low, and medium grades are worth 20 cents. Better grades of Sakel are up nearly 10 cents since the first of the month, and medium Sakel is quoted at 29 cents.

Arizona Cotton. Arizona cottons are selling very slowly and good grades can be bought between 30 and 32 cents. It now seems doubtful if even 50 per cent of last year's acreage will be planted to cotton in the Salt River Valley.

Sea Island Cotton. This has practically ceased to be a market factor. We merely mention it here to point out that the recent ginning census indicates that less than 2,000 bales will be secured from last year's crop.

Raincoat Fabrics. There has been a little more interest shown in raincoat materials during the past month. Inquiries have been more numerous and more orders have been booked than at this time last month but the situation is far from normal.

Mechanical Ducks and Drills. This market has been inactive due to the absence of volume buying. Mechanical goods production has not apparently increased during the month which accounts for the quiet ruling conditions of the duck market. Prices, although lower than last month, are firm and with advancing tendencies.

Sheetings. There was small interest shown in this material last month and quotations have been made largely on a nominal basis. Prices have declined since last month.

Tire Fabrics. There has been no improvement in this market nor has there been sufficient inquiry to induce fabric mills to make quotations. Most tire manufacturers are stocked with fabrics purchased last year, which must be absorbed. A hopeful sign, however, is that the large tire manufacturers are balancing their fabric stocks and preparing figures for spring and summer buying. The indications are that real market interest will develop within the next two months.

NEW YORK QUOTATIONS

March 26, 1921

Prices subject to change without notice

ASBESTOS CLOTH			
Brake Lining, 2½ lbs. sq. yd., brass or copper insertion	lb.		@
2¼ lbs. sq. yd., brass or copper insertion	lb.		@
BURLAPS			
32—7-ounce	100 yards	$3.85	@
32—8-ounce			@
40—7½-ounce		4.65	@
40—8-ounce		4.75	@
40—10-ounce		5.25	@
40—10½-ounce		5.35	@
45—7½-ounce		5.25	@
45—8-ounce		5.35	@
45—10-ounce		6.15	@
DRILLS			
38-inch 2.00-yard	yard	.15	@
49-inch 3.47-yard		.10½	@
52-inch 1.90-yard		.17½	@
52-inch 1.95 yard		.17	@
60-inch 1.52-yard		.21¼	@
DUCK			
CARRIAGE CLOTH			
58-inch 2.00-yard enameling duck	yard	.15½	@
48-inch 1.74-yard		.18½	@
72-inch 16.66-ounce		.39½	@
72-inch 17.21-ounce		.40¾	@
MECHANICAL			
Hose	pound	.30	@
Belting		.30	@
HOLLANDS, 40-INCH			
Acme	yard		@
Endurance			@
Penn			@
OSNABURGS			
40-inch 2.35-yard	yard		@
40-inch 2.48-yard			@
37½-inch 2.42-yard			@
RAINCOAT FABRICS			
COTTON			
Bombazine 64 x 60	yard	.12½	@
60 x 48		.11½	@
Cashmeres, cotton and wool, 36-inch, tan		.75	@
Twills 64 x 72		.10	@ .12
60 x 102		.16	@
Twill, mercerized, 36-inch, blue and black		.26½	@
tan and olive		.24	@
Tweed		.40	@ 1.00
printed		.22½	@
Plaids 60 x 48		.12½	@
56 x 44		.12	@
Repp		.32	@
Prints 60 x 48		.13	@
64 x 60		.14	@
IMPORTED WOOLEN FABRICS SPECIALLY PREPARED FOR RUBBERIZING—PLAIN AND FANCIES			
63-inch, 3¼ to 7½ ounces	yard	.81	@$2.22
36-inch, 2¾ to 5 ounces		.63	@ 1.62
IMPORTED PLAID LINING (UNION AND COTTON)			
63-inch, 2 to 4 ounces	yard	.71	@ 1.57
36 inch, 2 to 4 ounces		.44	@ .84
SHEETINGS, 40-INCH			
48 x 48, 2.35-yard	yard	.10¾	@
48 x 48, 2.50-yard		.10¼	@
48 x 48, 2.85-yard		.09½	@
64 x 68, 3.15-yard		.10½	@
56 x 60, 3.60-yard		.08¼	@
48 x 44, 3.75-yard		.07¼	@
SILKS			
Canton, 38-inch	yard	.29½	@
Schappe, 36-inch		.47½	@
STOCKINETTES			
SINGLE THREAD			
3½ Peeler, carded	pound		@
4½ Peeler, carded		*.55	@
6½ Peeler, combed		*.85	@

DOUBLE THREAD			
Zero Peeler, carded	pound	@	
3½ Peeler, carded		@	
6½ Peeler, combed		@	
TIRE FABRICS			
BUILDING			
17¼-ounce Sakellarides, combed	pound	@	
17¼-ounce Egyptian, combed		@	
17¼-ounce Egyptian, carded		@	
17¼-ounce Peeler, combed		@	
17¼-ounce Peeler, carded		@	
CORD			
15-ounce Egyptian	pound	@	
BICYCLE			
8-ounce American	pound	@	
10-ounce American		@	
CHAFER			
9½-ounce Sea Island	pound	@	
9½-ounce Egyptian, carded		@	
9¼-ounce Peeler, carded		@	

*Nominal.

THE MARKET FOR CHEMICALS AND COMPOUNDING INGREDIENTS

NEW YORK

DURING THE PAST MONTH the market for chemicals, pigments and rubber compounding ingredients has continued in a state of suspense and uncertainty, awaiting the hoped for industrial activity. Reports from the Akron district indicate a distinct gain in tire manufacturing activity but as yet the volume of rubber goods manufacturing has not called for heavy renewal of supplies of compounding ingredients.

ANILINE OIL. The movement has been at low ebb. Stocks were heavy and demand dull. Prices ruled from 20 to 26 cents per pound.

BARYTES. The business was featured by the movement of large resale stocks, weak prices and dull demand.

BENZOL. The demand has ruled generally fair to active. Early in the month 90 per cent grade was much in demand at 30 cents per gallon. Quotations on this grade have held from 28 to 30 cents, while that for pure, ranged from 30 to 36 cents.

BLANC FIXE. The same dullness controlled the blanc fixe situation as was evident with barytes. Early in the month producers generally had closed down their plants and lower prices ruled for stocks.

BLUE LEAD. About the middle of the month the market was featured by liquidation sales at one cent below market. Dullness prevails in the matter of demand and quotations are fixed at 7¼ to 7½ cents.

CARBON BLACK. A rise in prices of three cents per pound was noted the third week of the past month and lampblack was also stronger. The demand for blacks has been routine largely owing to reduced demand from the rubber tire industry.

CARBON BISULPHIDE. Very little interest in evidence. Prices from 8 to 8½ cents per pound.

CARBON TETRACHLORIDE. The demand has been fair. Prices declined from 12 to 10½ cents per pound.

CHINA CLAY. Stocks have accumulated in the absence of consumers' business.

DRY COLORS. There was slightly better inquiry as the month progressed. Earth colors are particularly quiet.

LITHARGE. The slump in rubber manufacturing has removed temporarily the largest part of the normal demand for litharge. Producers are limiting output to the trade needs. Increased activity of tire manufacturing after the middle of the month had some effect on demand and the situation is improving. Prices are 8¾ to 9 cents per pound.

LITHOPONE. Owing to the usual spring activity in the paint trade lithopone has been in brisk demand at 7 to 7½ cents in bags, 7½ cents in barrels.

SOLVENT NAPHTHA. Supplies low and demand very quiet.

SUBLIMED LEAD. The same condition of dullness rules with this as with the other lead pigments. Prices 7¼ to 7½ cents per pound.

SULPHUR. Prices are steady and movement of stock slow.

TALC. Prices weak and market very quiet.

WHITING. Imported, quoted at 1 to 1¾ cents per pound. Rubber makers other than the tire trade, have been taking some supplies.

ZINC OXIDE. There has been good demand for the lead-free grades for paint purposes. Production is markedly affected by general trade conditions and lack of demand from the tire makers. Prices are still held firmly.

NEW YORK QUOTATIONS

March 26, 1921

Prices subject to change without notice

ACCELERATORS, ORGANIC					
Accelerene (f. o. b. English port)	lb.	13s. 6d.			
Accelemal	lb.	$0.60	@		
Adco	lb.	.60	@		
Aldehyde ammonia crystals	lb.	1.00	@	1.10	
Aniline oil	lb.	.26	@	.28	
Excellerex	lb.	.70	@	.75	
Hexamethylene tetramine (powdered)	lb.	1.00	@	1.10	
N. C. C.	lb.		@		
No. 999	lb.	14½	@		
Paraphenylene diamine	lb.	2.00	@	2.25	
Thiocarbanilide (factory)	lb.	.65	@	.75	
ACCELERATORS, INORGANIC					
Lead, dry red (bbls.)	lb.	.09¼	@		
sublimed blue (bbls.)	lb.	.07¼	@	.07½	
sublimed white (bbls.)	lb.	.08¼	@		
white, basic carbonate (bbls.)	lb.	.07½	@	.08	
Lime, flour	lb.	.02½	@		
Superfine, "Cream of Lime"	lb.	.03	@		
Litharge, domestic	lb.	.08¾	@	.09	
sublimed	lb.		@		
Magnesium, carbonate, light	lb.	.09	@		
calcined extra light	lb.	.55	@		
calcined light	lb.	.25	@	.30	
calcined medium light	lb.	.25	@		
calcined heavy	lb.	.07	@		
calcined commercial (magnesite)	lb.	.05	@		
oxide, extra light	lb.	.65	@		
ACIDS					
Acetic 28 per cent	cwt.	2.50	@	2.75	
glacial, 99 per cent	cwt.	9.35	@	9.75	
Cresylic (97% straw color)	gal.	.95	@	1.02	
(95% dark)	gal.	.90	@	.97	
Muriatic, 20 degrees	cwt.	1.55	@	2.25	
Nitric, 36 degrees	cwt.	6.00	@	6.50	
Sulphuric, 66 degrees	ton	20.00	@	21.00	
ALKALIES					
Caustic soda (76% factory)	lb.	.03¾	@	.04½	
Soda ash, 58%	cwt.	1.90	@	2.10	
COLORS					
Black					
Bone, powdered	lb.	.06½	@	.14	
granulated	lb.	.12	@		
Carbon black (sacks, factory)	lb.	.10	@	.16	
pressed	lb.	.12	@		
compressed	lb.	.12½	@		
Dipped goods	lb.	1.00	@		
Drop	lb.	.08	@	.16	
Ivory black	lb.	.17	@	.45	
Lampblack	lb.	.16	@	.45	
Oil soluble aniline	lb.	.95	@		
Rubber black	lb.		@		
Rubber makers' non-flying black	lb.	.40	@		
Blue					
Cobalt	lb.	.25	@	.30	
Dipped goods	lb.	1.00	@		
Prussian	lb.	.60	@		
Ultramarine	lb.	.16	@	.35	
Rubber makers' blue	lb.	3.50	@		
Brown					
Iron oxide	lb.	.04	@	.04½	
Sienna, Italian, raw and burnt	lb.	.06½	@	.06¾	
Sienna, Italian, raw (tan color)	lb.	.07	@		
Umber, Turkey, raw and burnt	lb.	.04½	@	.05	
Vandyke	lb.	.06	@		
Maroon oxide	lb.	.13½	@		
Green					
Chrome, light	lb.	.37	@	.40	
medium	lb.	.40	@	.52	
dark	lb.	.44	@	.58	
commercial	lb.	.13½	@		
tile	lb.	.08	@	.12	
Dipped goods	lb.	1.00	@		
Oxide I. R.	lb.		@		
Oxide of chromium	lb.	.66	@		
Rubber makers' green	lb.	3.50	@		
Red					
Antimony, crimson, sulphuret of (casks)	lb.	.43	@	.46	
crimson, "R. M. P."	lb.	.55	@		
crimson F.	lb.	.45	@		
Antimony, golden sulphuret of	lb.	.24	@	.27	
golden, "R. M. P."	lb.	.25	@		
golden 1	lb.	.40	@		
golden 2	lb.	.35	@		
7-A	lb.	.42	@		
vermilion sulphuret	lb.	.65	@	.75	
red sulphuret	lb.	.25	@		
Arsenic, red sulphide	lb.	.14	@		
Dipped goods, red	lb.	1.25	@		
purple	lb.	1.00	@		
orange	lb.	1.25	@		
Indian	lb.	.13½	@		
Para toner	lb.	1.60	@		
Red excelsior	lb.		@		
Toluidine toner	lb	3.25	@	3.50	
Iron oxide, reduced grades	lb.	.04	@	.12	
pure bright	lb.	.14½	@	.15½	
Spanish natural	lb.	.05½	@	.05¾	
Venetian	lb.	.03	@	.06	

Oil soluble aniline, red	lb.	$1.75	@$2.00
orange	lb.	1.50	@
Oxinony	lb.	.17½	@
Vermilion, American	lb.	.25	@ .30
permanent	lb.	.34	@
English quicksilver	lb.	1.00	@ 1.15
Rubber makers' red	lb.	3.50	@
purple	lb.	2.50	@
White			
Albalith	lb.	.07	@ .07½
Aluminum bronze, extra brilliant	lb.		@
extra fine	lb.		@
Lithopone, Beckton white	lb.	.07	@ .07½
Lithopone, domestic (factory)	lb.	.07	@ .07½
Ponolith (carloads, factory)	lb.		@
Rubber-makers' white	lb.		@
Zinc oxide, American Horse Head brand (factory):		C.L.	L.C.L.
Special	lb.	.09¼	@ .09¾
XX red	lb.	.08¾	@ .09¼
French process, Florence brand (factory):			
White seal	lb.	.12¼	@ .12½
Green seal	lb.	.11	@ .11½
Red seal	lb.	.10	@ .10½
White seal, imported	lb.	.12¼	@ .12½
Azo factory:			
ZZZ (lead free)	lb.	.08¾	@ .09¼
ZZ (under 5% leaded)	lb.	.08	@ .08½
Z (8-10% leaded)	lb.	.07⅝	@ .08⅛
Standard AA	lb.	.09	@
Yellow			
Cadmium, sulphide, yellow, light, orange	lb.		@
red	lb.		@
Chrome, light and medium	lb.	.25	@
C. P.	lb.	.28	@
Dipped goods	lb.	1.25	@
Ochre, domestic	lb.	.02	@ .02½
imported	lb.	.03½	@ .04
Oil soluble aniline	lb.	1.60	@
Rubber makers' yellow	lb.	2.50	@ 3.50
Zinc chromate	lb.	.40	@ .41

COMPOUNDING INGREDIENTS

Aluminum flake (carload)	ton	33.00	@45.00
hydrate	lb.	.22	@
silicate	ton	26.00	@28.00
Ammonium carbonate (powdered)	lb.	.08	@ .10
Asbestine	ton	20.00	@35.00
Barium, carbonate, precipitated	ton	85.00	@
dust	ton	100.00	@110.00
Barytes, pure white (f. o. b. works)	ton	28.00	@
white	ton	35.00	@45.00
white, No. 3	ton	30.00	@
off color	ton	20.00	@
uniform floated	ton	28.00	@
German "Cream"	ton		@
Baso for	lb.	.05	@
Beta-naphthol	lb.	.70	@ .75
Blanc fixe	lb.	.05	@ .06¼
Bone ash	lb.	.10	@
Carrara filler (factory)	ton	18.00	@
Chalk, precipitated, extra light	lb.		@
heavy	lb.		@
China, clay, Dixie	ton	22.00	@35.00
Blue Ridge	ton	22.00	@35.00
domestic	ton	10.00	@12.00
imported	ton	50.00	@
Cotton linters, clean mill run (factory)	lb.	.02	@
Fossil flour (powdered)	ton	60.00	@
(bolted)	ton	65.00	@
Glue, high grade	lb.	.30	@ .40
medium	lb.	.25	@ .30
low grade	lb.	.17	@ .19
Graphite, flake (400-pounds bbl.)	lb.	.10	@ .30
amorphous	lb.	.04	@
Ground glass FF. (bbls.)	lb.		@
Infusorial earth (powdered)	ton	60.00	@
(bolted)	ton	65.00	@
Liquid rubber	lb.	.16	@
Mica, powdered	lb.	.15	@
Pumice stone, powdered (bbl.)	lb.	.03	@ .08
Rotten stone, powdered	lb.	.02½	@ .04½
Rubber paste	lb.		@
Silica, gold bond (factory)	ton	25.00	@
silver bond (factory)	ton	18.00	@
Soap bark, crushed	lb.	.14½	@ .15
Soapstone, powdered gray (carload)	ton	12.00	@
Italian Talc	lb.	.02	@ .02½
Starch, powdered corn	cwt.	2.58	@
Talc, powdered soapstone	ton	22.50	@25.00
Terra blanche	ton	25.00	@
Tripoli flour, air-floated, cream or rose (factory)	ton	25.00	@
white (factory)	ton	27.00	@
Tyre-lith	ton	100.00	@
Whiting, Alba	cwt.		@
Columbia	cwt.	.75	@
commercial	cwt.	1.25	@
Danish (factory)	ton	15.00	@
English cliffstone	cwt.	1.75	@ 2.00
gilders	cwt.	1.45	@ 1.90
Paris, white, American	cwt.	.90	@ 1.50
Quaker	ton	13.00	@15.00
Super	ton		@
Wood pulp, imported	ton		@
XXX	ton	35.00	@
X	ton	35.00	@
Wood flour	ton		@

MINERAL RUBBER

Elateron (c. l. factory)	ton		@
(l. c. l. factory)	ton		@
Gilsonite	ton	70.00	@
Genasco (c. l. factory)	ton	50.00	@
(l. c. l. factory)	ton	52.00	@
Hard hydrocarbon	ton	35.00	@45.00
Soft hydrocarbon	ton		@
K-X	ton		@
K. M. R.	ton		@
M. R. X.	ton		@
Pioneer (c. l. factory)	ton	$50.00	@
(l. c. l. factory)	ton	55.00	@
Raven M. R.	ton		@
Refined Elaterite	ton		@
318/320 M. P. hydrocarbon (c. l. factory)	ton	50.00	@55.00
(l. c. l. factory)	ton	57.50	@
300/310 M. P. hydrocarbon (c. l. factory)	ton	40.00	@
(l. c. l. factory)	ton	45.00	@
States "A" (c. l. factory)	ton	45.00	@
No. 1 (c. l. factory)	ton	40.00	@
Robertson, M. R. pulverized (c. l. factory)	ton	87.50	@
M. R pulverized (l. c. l. factory)	ton	90.00	@
M. R. (c. l. factory)	ton	62.50	@
M. R. (l. c. l. factory)	ton	65.00	@
Rubrax (factory)	ton	50.00	@
Synpro, granulated, M. R. (factory)	ton	87.50	@
Walpole rubber flux (factory)	lb.		@

OILS

Avoilas compound	lb.	.16	@
Castor, No. 1, U. S. P.	lb.	.11	@
No. 3, U. S. P.	lb.	.10	@
Corn	lb.	.09	@
Cotton	lb.	.08½	@
Glycerine (98 per cent)	lb.	.18	@ .19
Linseed, raw (carloads)	gal.	.72	@
Linseed compound	gal.		@
Palmoline	lb.	.13	@ .14
Palm niger	lb.	.08	@
Palm "Lagos"	lb.	.11½	@
Palm special	lb.		@
Peanut	lb.	.10	@
Petrolatum	lb.	.05	@ .09
Petrolatum, sticky	lb.	.06	@ .10
Petroleum grease	lb.		@
Pine, steam distilled	gal.	1.35	@ 1.40
Rapeseed, refined	lb.	.13	@
blown	lb.	.15	@
Rosin	gal.	.40	@ .42
Synpro	gal.	.40	@ .60
Soya bean	lb	.08	@
Tar	gal.	.35	@ .36

RESINS AND PITCHES

Balsam, Oregon fir	gal.	2.00	@
Cantella gum	lb.	.50	@
Cumar resin, hard	lb.	.09	@ .13
soft	lb.	.09	@ .13
Tar, retort	bbl.	12.75	@14.75
kiln	bbl.	12.75	@14.00
Pitch, Burgundy	lb.	.04¼	@
coal tar	lb.	.01½	@
pine tar	lb.	.03½	@
ponto	lb.	.10	@
Rosin, K	280 lbs.	6.35	@
strained	280 lbs.	6.00	@
Shellac, fine orange	lb.	1.00	@

SOLVENTS

Acetone (98.99 per cent drums)	lb.	.12	@
methyl (drums)	gal.		@
Benzol (water white, 90%)	gal.	.25	@ 31
pure	gal.	.36	@
Carbon bisulphide (drums)	lb.	.07	@ .07¾
tetrachloride (drums)	lb.	.12	@ .13
Naphtha, motor gasoline (steel bbls.)	gal.	.26	@
73@76 degrees (steel bbls.)	gal.	.37½	@
70@72 (steel bbls.)	gal.		@
68@70 degrees (steel bbls.)	gal.	.35	@
V. M. & P. (steel bbls.)	gal.	.25	@
solvent	gal.	.28	@
Toluol, pure	gal.	.28	@ .34
Turpentine, spirits	gal.	.58	@
wood	gal.	.55	@
Osmaco reducer	gal.		@
Xylol, pure	gal.	.45	@ .51
commercial	gal.	.25	@ .31

SUBSTITUTES

Black	lb.	.08	@ .17
White	lb.	.10	@ .19
Brown	lb.	.12	@ .18
Brown factice	lb.	.07	@ .15
White factice	lb.	.08½	@ .15
Paragol, soft and medium	cwt.	10.91	@
hard	cwt.	10.91	@

VULCANIZING INGREDIENTS

Lead, black hyposulphite (black hypo)	lb.		@
Orange mineral, domestic	lb.	.12½	@
Sulphur chloride (jugs)	lb.	.20	@
(drums)	lb.	.06½	@ .07½
Sulphur, flour, Brooklyn brand (carloads)	cwt.	2.35	@ 2.60
Brooklyn brand (less carload)	cwt.	2.65	@ 2.90
Bergenport (carloads, factor)	cwt.	2.55	@
Pure soft	cwt.	2.30	@
superfine (carloads, factory)	cwt.	2.00	@ 2.90

(See also Colors—Antimony.)

WAXES

Wax, beeswax, white, commercial	lb.	.60	@
ceresin, white	lb.	.14	@
carnauba	lb.	.20	@
Montan	lb.	.09	@
ozokerite, black	lb.	.30	@
green	lb.	.30	@
paraffine, 115° m. p.	lb.		@
120° m. p.	lb.		@
125° m. p.	lb.		@
130° m. p.	lb.		@
Phenanthrene	lb.	.08	@ .10
Sweet wax	lb.	.12	@

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TABLE OF CONTENTS